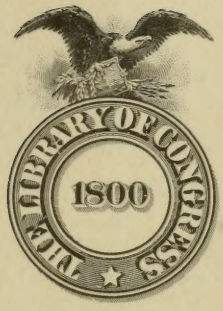
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# FAMILIAR

# LETTERS ON CHEMISTRY,

AND ITS

## RELATION TO COMMERCE, PHYSIOLOGY, AND AGRICULTURE.

BY JUSTUS LIEBIG, M. D., PH. D., F. R. S.,
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MEMBER OF THE CHEMICAL SOCIETY.

NEW YORK:
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# PREFACE.

The Letters contained in this little Volume embrace some of the most important points of the science of Chemistry, in their application to Natural Philosophy, Physiology, Agriculture, and Commerce. Some of them treat of subjects which have already been, or will hereafter be, more fully discussed in my larger works. They were intended to be mere sketches, and were written for the especial purpose of exciting the attention of governments, and an enlightened public, to the necessity of establishing Schools of Chemistry, and of promoting, by every means, the study of a science so intimately connected

with the arts, pursuits, and social well-being of modern civilized nations.

For my own part I do not scruple to avow the conviction, that ere long, a knowledge of the principal truths of Chemistry will be expected in every educated man, and that it will be as necessary to the Statesman and Political Economist, and the Practical Agriculturist, as it is already indispensable to the Physician and the Manufacturer.

In Germany, such of these Letters as have been already published, have not failed to produce some of the results anticipated. New professorships have been established in the Universities of Gottingen and Wurtzburg, for the express purpose of facilitating the application of chemical truths to the practical arts of life, and of following up the new line of investigation and research—the bearing of Chemistry upon Physiology, Medicine, and Agriculture,—which may be said to be only just begun.

My friend, Dr. Ernest Dieffenbach, one of my first pupils, who is well acquainted with all the branches of Chemistry, Physics, Natural History, and Medicine, suggested to me that a collection of these Letters would be acceptable to the English public, which has so favorably received my former works.

I readily acquiesced in the publication of an English edition, and undertook to write a few additional Letters, which should embrace some conclusions I have arrived at, in my recent investigations, in connexion with the application of chemical science to the physiology of plants and agriculture.

My esteemed friend, Dr. Gardner, has had the kindness to revise the manuscript and the proof-sheets for publication, for which I cannot refrain expressing my best thanks.

It only remains for me to add a hope, that this little offering may serve to make new friends to our beautiful and useful science,

and be a remembrancer to those old friends who have, for many years past, taken a lively interest in all my labors.

JUSTUS LIEBIG.

GIESSEN, *August*, 1843.

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# LETTERS ON CHEMISTRY.

## LETTER I.

My dear sir: The influence which the science of chemistry exercises upon human industry, agriculture, and commerce; upon physiology, medicine, and other sciences, is now so interesting a topic of conversation everywhere, that it may be no unacceptable present to you if I trace in a few familiar letters some of the relations it bears to these various sciences, and exhibit for you its actual effects upon the present social condition of mankind.

In speaking of the present state of chemistry, its rise and progress, I shall need no apology if, as a preliminary step, I call your attention to the implements which the chemist employs—the means which are indispensable to his labors and to his success.

These consist, generally, of materials furnished to us by nature, endowed with many most remark-

able properties fitting them for our purposes. If one of them is a production of art, yet its adaptation to the use of mankind—the qualities which render it available to us—must be referred to the same source as those derived immediately from nature.

Cork, platinum, glass, and caoutchouc, are the substances to which I allude, and which minister so essentially to modern chemical investigations. Without them, indeed, we might have made some progress, but it would have been slow; we might have accomplished much, but it would have been far less than has been done with their aid. Some persons, by the employment of expensive substitutes, might have successfully pursued the science; but incalculably fewer minds would have been engaged in its advancement. These materials have only been duly appreciated and fully adopted within a very recent period. In the time of Lavoisier, the rich alone could make chemical researches; the necessary apparatus could only be procured at a very great expense.

And first, of glass: every one is familiar with most of the properties of this curious substance—its transparency, hardness, destitution of color, and stability under ordinary circumstances. To these obvious qualities we may add those which especially adapt it to the use of the chemist, namely, that it is unaffected by most acids or

other fluids contained within it. At certain temperatures it becomes more ductile and plastic than wax, and may be made to assume in our hands, before the flame of a common lamp, the form of every vessel we need to contain our materials, and of every apparatus required to pursue our experiments.

Then, how admirable and valuable are the properties of cork! How little do men reflect upon the inestimable worth of so common a substance! How few rightly esteem the importance of it to the progress of science, and the moral advancement of mankind! There is no production of nature or art equally adapted to the purposes to which the chemist applies it. Cork consists of a soft, highly elastic substance, as a basis, having diffused throughout a matter with properties resembling wax, tallow, and resin, yet dissimilar to all of these, and termed *suberin*. This renders it perfectly impermeable to fluids, and, in a great measure, even to gases. It is thus the fittest material we possess for closing our bottles, and retaining their contents. By its means, and with the aid of caoutchouc, we connect our vessels and tubes of glass, and construct the most complicated apparatus. We form joints and links of connexion, adapt large apertures to small, and thus dispense altogether with the aid of the brass-founder

and the mechanist. Thus the implements of the chemist are cheaply and easily procured, immediately adapted to any purpose, and readily repaired or altered.

Again: in investigating the composition of solid bodies—of minerals—we are under the necessity of bringing them into a liquid state, either by solution or fusion. Now vessels of glass, of porcelain, and of all non-metallic substances, are destroyed by the means we employ for that purpose—are acted upon by many acids, by alkalies, and the alkaline carbonates. Crucibles of gold and silver would melt at high temperatures. But we have a combination of all the qualities we can desire, in platinum. This metal was only first adapted to these uses about fifty years since. It is cheaper than gold, harder and more durable than silver, infusible at all temperatures of our furnaces, and is left intact by acids and alkaline carbonates. Platinum unites all the valuable properties of gold and of porcelain, resisting the action of heat, and of almost all chemical agents.

As no mineral analysis could be made perfectly without platinum vessels, had we not possessed this metal, the composition of minerals would have yet remained unknown; without cork and caoutchouc we should have required the costly aid of the mechanician at every step. Even without

the latter of these adjuncts, our instruments would have been far more costly and fragile. Possessing all these gifts of nature, we economize incalculably our time—to us more precious than money!

Such are our instruments. An equal improvement has been accomplished in our laboratory. This is no longer the damp, cold, fire-proof vault of the metallurgist, nor the manufactory of the druggist, fitted up with stills and retorts. On the contrary, a light, warm, comfortable room, where beautifully constructed lamps supply the place of furnaces, and the pure and odorous flame of gas or of spirits of wine supersedes coal and other fuel, and gives us all the fire we need; where health is not invaded, nor the free exercise of thought impeded; there we pursue our inquiries, and interrogate nature to reveal her secrets.

To these simple means must be added the *balance*, and then we possess everything which is required for the most extensive researches.

The great distinction between the manner of proceeding in chemistry and natural philosophy, is, that one *weighs*, the other *measures*. The natural philosopher has applied his measures to nature for many centuries, but only for fifty years have we attempted to advance our philosophy by *weighing*.

For all great discoveries chemists are indebted to the balance—that incomparable instrument which gives permanence to every observation, dispels all ambiguity, establishes truth, detects error, and guides us in the true path of inductive science.

The balance, once adopted as a means of investigating nature, put an end to the school of Aristotle in physics. The explanation of natural phenomena by mere fanciful speculations, gave place to a true natural philosophy. Fire, air, earth, and water, could no longer be regarded as elements. Three of them could henceforth be considered only as significative of the *forms* in which all matter exists. Everything with which we are conversant upon the surface of the earth is solid, liquid, or aeriform; but the notion of the elementary nature of air, earth, and water, so universally held, was now discovered to belong to the errors of the past.

Fire was found to be but the visible and perceptible indication of changes proceeding within the so-called elements.

Lavoisier investigated the composition of the atmosphere and of water, and studied the many wonderful offices performed by an element common to both in the scheme of nature, namely, *oxygen:* and he discovered many of the properties of this elementary gas.

After his time, the principal problem of chemical philosophers was to determine the composition of the solid matters composing the earth. To the eighteen metals previously known, were soon added twenty-four discovered to be constituents of minerals. The great mass of the earth was shown to be composed of metals in combination with oxygen, to which they are united in one, two, or more definite and unalterable proportions, forming compounds which are termed metallic oxides, and these again, combined with oxides of other bodies, essentially different to metals, namely, carbon, and silicium. If to these we add certain compounds of sulphur with metals, in which the sulphur takes the place of oxygen, and forms sulphurets, and one other body—common salt—(which is a compound of sodium and chlorine), we have every substance which exists in a solid form upon our globe in any very considerable mass. Other compounds, innumerably various, are found only in small scattered quantities.

The chemist, however, did not remain satisfied with the separation of minerals into their component elements, *i. e.*, their analysis ; but he sought by synthesis, *i. e.*, by combining the separate elements and forming substances similar to those constructed by nature, to prove the accuracy of his processes and the correctness of his conclusions

Thus he formed, for instance, pumice-stone, fel-spar, mica, iron pyrites, &c., artificially.

But of all the achievements of inorganic chemistry, the artificial formation of lapis lazuli was the most brilliant and the most conclusive. This mineral, as presented to us by nature, is calculated powerfully to arrest our attention by its beautiful azure-blue color, its remaining unchanged by exposure to air or to fire, and furnishing us with a most valuable pigment, Ultramarine, more precious than gold!

The analysis of lapis lazuli represented it to be composed of silica, alumina, and soda, three colorless bodies, with sulphur and a trace of iron. Nothing could be discovered in it of the nature of a pigment, nothing to which its blue color could be referred, the cause of which was searched for in vain. It might therefore have been supposed that the analyst was here altogether at fault, and that at any rate its artificial production must be impossible. Nevertheless, this has been accomplished, and simply by combining in the proper proportions, as determined by analysis, silica, alumina, soda, iron, and sulphur. Thousands of pounds weight are now manufactured from these ingredients, and this artificial ultramarine is as beautiful as the natural, while for the price of a single ounce of the latter we may obtain many pounds of the former.

With the production of artificial lapis lazuli, the formation of mineral bodies by synthesis ceased to be a scientific problem to the chemist; he has no longer sufficient interest in it to pursue the subject. He may now be satisfied that analysis will reveal to him the true constitution of minerals. But to the mineralogist and geologist it is still in a great measure an unexplored field, offering inquiries of the highest interest and importance to their pursuits.

After becoming acquainted with the constituent elements of all the substances within our reach, and the mutual relations of these elements, the remarkable transmutations to which bodies are subject under the influence of the vital powers of plants and animals, became the principal object of chemical investigations, and the highest point of interest. A new science, inexhaustible as life itself, is here presented us, standing upon the sound and solid foundation of a well-established inorganic chemistry. Thus the progress of science is, like the development of nature's works, gradual and expansive. After the buds and branches spring forth the leaves and blossoms, after the blossoms the fruit.

Chemistry, in its application to animals and vegetables, endeavors jointly with physiology to enlighten us respecting the mysterious processes and sources of organic life.

## LETTER II

My dear sir: In my former letter I reminded you that three of the supposed elements of the ancients represent the forms or state in which all the ponderable matter of our globe exists; I would now observe, that no substance possesses absolutely any one of those conditions; that modern chemistry recognises nothing unchangeably solid, liquid, or aeriform: means have been devised for effecting a change of state in almost every known substance. Platinum, alumina, and rock crystal, it is true, can not be liquefied by the most intense heat of our furnaces, but they melt like wax before the flame of the oxy-hydrogen blowpipe. On the other hand, of the twenty-eight gaseous bodies with which we are acquainted, twenty-five may be reduced to a liquid state, and one into a solid. Probably, ere long, similar changes of condition will be extended to every form of matter.

There are many things relating to this condensation of the gases worthy of your attention. Most

aeriform bodies, when subjected to compression, are made to occupy a space which diminishes in the exact ratio of the increase of the compressing force. Very generally, under a force double or triple of the ordinary atmospheric pressure they become one half or one third their former volume. This was a long time considered to be a law, and known as the law of Marriotte ; but a more accurate study of the subject has demonstrated that this law is by no means of general application. The volume of certain gases does *not* decrease in the ratio of the increase of the force used to compress them, but in some, a diminution of their bulk takes place in a *far greater degree* as the pressure increases.

Again, if ammoniacal gas is reduced by a compressing force to one sixth of its volume, or carbonic acid is reduced to one thirty-sixth, a portion of them loses entirely the form of a gas, and becomes a liquid, which, when the pressure is withdrawn, assumes again in an instant its gaseous state—another deviation from the law of Marriotte.

Our process for reducing gases into fluids is of admirable simplicity. A simple bent tube, or a reduction of temperature by artificial means, have superseded the powerful compressing machines of the early experimenters.

The cyanuret of mercury, when heated in an open glass tube, is resolved into cyanogen gas and

metallic mercury ; if this substance is heated in a tube hermetically sealed, the decomposition occurs as before, but the gas, unable to escape, and shut up in a space several hundred times smaller than it would occupy as gas under the ordinary atmospheric pressure, becomes a fluid in that part of the tube which is kept cool.

When sulphuric acid is poured upon limestone in an open vessel, carbonic acid escapes with effervescence as a gas, but if the decomposition is effected in a strong, close, and suitable vessel of iron, we obtain the carbonic acid in the state of liquid. In this manner it may be obtained in considerable quantities, even many pounds weight. Carbonic acid is separated from other bodies with which it is combined as a fluid under a pressure of thirty-six atmospheres.

The curious properties of fluid carbonic acid are now generally known. When a small quantity is permitted to escape into the atmosphere, it assumes its gaseous state with extraordinary rapidity, and deprives the remaining fluid of caloric so rapidly that it congeals into a white crystalline mass like snow : at first it was indeed thought to be really snow, but upon examination it proved to be pure frozen carbonic acid. This solid, contrary to expectation, exercises only a feeble pressure upon the surrounding medium. The fluid acid enclosed

in a glass tube rushes at once, when opened, into a gaseous state, with an explosion which shatters the tube into fragments; but solid carbonic acid can be handled without producing any other effect than a feeling of intense cold. The particles of the carbonic acid being so closely approximated in the solid, the whole force of cohesive attraction (which in the fluid is weak) becomes exerted, and opposes its tendency to assume its gaseous state; but as it receives heat from surrounding bodies, it passes into gas gradually and without violence. The transition of solid carbonic acid into gas deprives all around it of caloric so rapidly and to so great an extent, that a degree of cold is produced immeasurably great, the greatest indeed known. Ten, twenty, or more pounds weight of mercury, brought into contact with a mixture of ether and solid carbonic acid, become in a few moments firm and malleable. This, however, can not be accomplished without considerable danger. A melancholy accident occurred at Paris, which will probably prevent for the future the formation of solid carbonic acid in these large quantities, and deprive the next generation of the gratification of witnessing these curious experiments. Just before the commencement of the lecture in the Laboratory of the Polytechnic School, an iron cylinder, two feet and a half long and one foot in diameter, in which

carbonic acid had been developed for experiment before the class, burst, and its fragments were scattered about with the most tremendous force; it cut off both the legs of the assistant and killed him on the spot. This vessel, formed of the strongest cast-iron, and shaped like a cannon, had often been employed to exhibit experiments in the presence of the students. We can scarcely think, without shuddering, of the dreadful calamity such an explosion would have occasioned in a hall filled with spectators.

When we had ascertained the fact of gases becoming fluid under the influence of cold or pressure, a curious property possessed by charcoal, that of absorbing gas to the extent of many times its volume,—ten, twenty, or even, as in the case of ammoniacal gas or muriatic acid gas, eighty or ninety fold—which had been long known, no longer remained a mystery. Some gases are absorbed and condensed within the pores of the charcoal, into a space several hundred times smaller than they before occupied; and there is now no doubt they there become fluid, or assume a solid state. As in a thousand other instances, chemical action here supplants mechanical forces. *Adhesion* or heterogeneous attraction, as it is termed, acquired by this discovery a more extended meaning; it had never before been thought of as a cause of

change of state in matter; but it is now evident that a gas adheres to the surface of a solid body by the same force which condenses it into a liquid.

The smallest amount of a gas—atmospheric air for instance—can be compressed into a space a thousand times smaller by mere mechanical pressure, and then its bulk must be to the least measurable surface of a solid body, as a grain of sand to a mountain. By the mere effect of mass —the force of gravity—gaseous molecules are attracted by solids and adhere to their surfaces; and when to this physical force is added the feeblest chemical affinity, the liquefiable gases can not retain their gaseous state. The amount of air condensed by these forces upon a square inch of surface is certainly not measurable; but when a solid body, presenting several hundred square feet of surface within the space of a cubic inch, is brought into a limited volume of gas, we may understand why that volume is diminished, why all gases without exception are absorbed. A cubic inch of charcoal must have, at the lowest computation, a surface of one hundred square feet. This property of absorbing gases varies with different kinds of charcoal: it is possessed in a higher degree by those containing the most pores, that is, where the pores are finer; and in a lower degree in the more spongy kinds, that is, where the pores are larger.

In this manner every porous body—rocks, stones, the clods of the fields, &c.—imbibe air, and therefore oxygen; the smallest solid molecule is thus surrounded by its own atmosphere of condensed oxygen; and if in their vicinity other bodies exist which have an affinity for oxygen, a combination is effected. When, for instance, carbon and hydrogen are thus present, they are converted into nourishment for vegetables—into carbonic acid and water. The development of heat when air is imbibed, and the production of steam when the earth is moistened by rain, are acknowledged to be consequences of this condensation by the action of surfaces.

But the most remarkable and interesting case of this kind of action is the imbibition of oxygen by metallic platinum. This metal, when massive, is of a lustrous white color, but it may be brought, by separating it from its solutions, into so finely divided a state, that its particles no longer reflect light, and it forms a powder as black as soot. In this condition it absorbs eight hundred times its volume of oxygen gas, and this oxygen must be contained within it in a state of condensation very like that of fluid water.

When gases are thus condensed, that is, their particles made to approximate in this extraordinary manner, their properties can be palpably shown.

Their chemical actions become apparent as their physical characteristic disappears. The latter consists in the continual tendency of their particles to separate from each other; and it is easy to imagine that this elasticity of gaseous bodies is the principal impediment to the operation of their chemical force; for this becomes more energetic as their particles approximate. In that state in which they exist within the pores or upon the surface of solid bodies, their repulsion ceases, and their whole chemical action is exerted. Thus combinations which oxygen can not enter into, decompositions which it can not effect while in the state of gas, take place with the greatest facility in the pores of platinum containing condensed oxygen. When a jet of hydrogen gas, for instance, is thrown upon spongy platinum, it combines with the oxygen condensed in the interior of the mass; at their point of contact water is formed, and as the immediate consequence heat is evolved; the platinum becomes red hot and the gas is inflamed. If we interrupt the current of the gas, the pores of the platinum become instantaneously filled again with oxygen; and the same phenomena can be repeated a second time, and so on interminably.

In finely pulverized platinum, and even in spongy platinum, we therefore possess a *perpetuum mobile* —a mechanism like a watch which runs out and

winds itself up—a force which is never exhausted —competent to produce effects of the most powerful kind, and self-renewed *ad infinitum*.

Many phenomena, formerly inexplicable, are satisfactorily explained by these recently discovered properties of porous bodies. The metamorphosis of alcohol into acetic acid, by the process known as the quick vinegar manufacture, depends upon principles, at a knowledge of which we have arrived by a careful study of these properties.

## LETTER III.

My dear sir: The manufacture of soda from common culinary salt may be regarded as the foundation of all our modern improvements in the domestic arts; and we may take it as affording an excellent illustration of the dependance of the various branches of human industry and commerce upon each other, and their relation to chemistry.

Soda has been used from time immemorial in the manufacture of soap and glass, two chemical productions, which employ and keep in circulation an immense amount of capital. The quantity of soap consumed by a nation would be no inaccurate measure whereby to estimate its wealth and civilization. Of two countries with an equal amount of population, the wealthiest and most highly civilized will consume the greatest weight of soap. This consumption does not subserve sensual gratification, nor depend upon fashion, but upon the feeling of the beauty, comfort, and welfare, attendant upon cleanliness; and a regard

to this feeling is coincident with wealth and civilization. The rich in the middle ages concealed a want of cleanliness in their clothes and persons, under a profusion of costly scents and essences, while they were more luxurious in eating and drinking, in apparel and horses. With us a want of cleanliness is equivalent to insupportable misery and misfortune.

Soap belongs to those manufactured products, the money value of which continually disappears from circulation, and requires to be continually renewed. It is one of the few substances which are entirely consumed by use, leaving no product of any worth. Broken glass and bottles are by no means absolutely worthless; for rags we may purchase new cloth, but soap-water has no value whatever. It would be interesting to know accurately the amount of capital involved in the manufacture of soap; it is certainly as large as that employed in the coffee trade, with this important difference as respects Germany, that it is entirely derived from our own soil. France formerly imported soda from Spain, Spanish soda being of the best quality, at an annual expenditure of twenty to thirty millions of francs. During the war with England, the price of soda, and consequently of soap and glass, rose continually; and all manufactures suffered in consequence.

The present method of making soda from common salt was discovered by Le Blanc at the end of the last century. It was a rich boon for France, and became of the highest importance during the war of Napoleon. In a very short time it was manufactured to an extraordinary extent, especially at the seat of the soap manufactories. Marseilles possessed for a time a monopoly of soda and soap. The policy of Napoleon deprived that city of the advantages derived from this great source of commerce, and thus excited the hostility of the population to his dynasty, which became favorable to the restoration of the Bourbons. A curious result of an improvement in a chemical manufacture! It was not long, however, in reaching England.

In order to prepare the soda of commerce (which is the carbonate) from common salt, it is first converted into Glauber's salt (sulphate of soda). For this purpose 80 pounds weight of concentrated sulphuric acid (oil of vitrol) are required to 100 pounds of common salt. The duty upon salt checked, for a short time, the full advantage of this discovery; but when the government repealed the duty, and its price was reduced to its minimum, the cost of soda depended upon that of sulphuric acid.

The demand for sulphuric acid now increased to an immense extent; and, to supply it, capital

was embarked abundantly, as it afforded an excellent remuneration. The origin and formation of sulphuric acid was studied most carefully; and from year to year, better, simpler, and cheaper methods for making it were discovered. With every improvement in the mode of manufacture, its price fell; and its sale increased in an equal ratio.

Sulphuric acid is now manufactured in leaden chambers, of such magnitude that they would contain the whole of an ordinary sized house. As regards the process and the apparatus, this manufacture has reached its acmé—scarcely is either susceptible of improvement. The leaden plates of which the chambers are constructed, requiring to be joined together with lead (since tin or solder would be acted on by the acid), this process was, until lately, as expensive as the plates themselves; but now, by means of the oxy-hydrogen blowpipe, the plates are cemented together at their edges, by mere fusion, without the intervention of any kind of solder.

And then, as to the process; according to theory, 100 pounds weight of sulphur ought to produce 306 pounds of sulphuric acid; in practice, 300 pounds are actually obtained; the amount of loss is therefore too insignificant for consideration.

Again; saltpetre being indispensable in making sulphuric acid, the commercial value of that salt

had formerly an important influence upon its price. It is true that 100 pounds of saltpetre only are required to 1000 pounds of sulphur; but its cost was four times greater than an equal weight of the latter.

Travellers had observed, near the small seaport of Yquiqui, in the district of Atacama, in Peru, an efflorescence covering the ground over extensive districts. This was found to consist principally of nitrate of soda. Advantage was quickly taken of this discovery. The quantity of this valuable salt proved to be inexhaustible, as it exists in beds extending over more than 200 square miles. It was brought to England at less than half the freight of the East India saltpetre (nitrate of potassa); and as, in the chemical manufacture, neither the potash nor the soda were required, but only the nitric acid, in combination with the alkali, the soda-saltpetre of South America soon supplanted the potash-nitre of the East. The manufacture of sulphuric acid received a new impulse; its price was much diminished without injury to the manufacturer; and, with the exception of fluctuations, caused by the impediments thrown in the way of the export of sulphur from Sicily, it soon became reduced to a minimum, and remained stationary.

Potash-saltpetre is now only employed in the

manufacture of gunpowder; it is no longer in demand for other purposes; and thus, if Government effect a saving of many hundred thousand pounds annually in gunpowder, this economy must be attributed to the increased manufacture of sulphuric acid.

We may form an idea of the amount of sulphuric acid consumed, when we find that 50,000 pounds weight are made by a small manufactory, and from 200,000 to 600,000 pounds by a large one, annually. This manufacture causes immense sums to flow annually into Sicily. It has introduced industry and wealth into the arid and desolate districts of Atacama. It has enabled us to obtain platina from its ores at a moderate and yet remunerating price; since the vats employed for concentrating this acid are constructed of this metal, and cost from 1000*l.* to 2000*l.* sterling. It leads to frequent improvements in the manufacture of glass, which continually becomes cheaper and more beautiful. It enables us to return to our fields all their potash—a most valuable and important manure—in the form of ashes, by substituting soda in the manufacture of glass and soap.

It is impossible to trace, within the compass of a letter, all the ramifications of this tissue of changes and improvements resulting from one chemical manufacture; but I must still claim your

attention to a few more of its most important and immediate results. I have already told you, that in the manufacture of soda from culinary salt, it is first converted into sulphate of soda. In this first part of the process, the action of sulphuric acid produces primary muriatic acid to the extent of one and a half the amount of the sulphuric acid employed. At first, the profit upon the soda was so great that no one took the trouble to collect the muriatic acid ; indeed it had no commercial value. A profitable application of it was, however, soon discovered : it is a compound of chlorine, and this substance may be obtained from it purer than from any other source. The bleaching power of chlorine has long been known ; but it was only employed upon a large scale after it was obtained from residuary muriatic acid, and it was found that in combination with lime it could be transported to distances without inconvenience. Thenceforth it was used for bleaching cotton ; and, but for this new bleaching process, it would scarcely have been possible for the cotton manufacture of Great Britain to have attained its present enormous extent—it could not have competed in price with France and Germany. In the old process for bleaching, every piece must be exposed to the air and light during several weeks in the summer, and kept continually moist by

manual labor. For this purpose, meadow land, suitably situated, was essential. But a single establishment near Glasgow bleaches 1,400 pieces of cotton daily, throughout the year. What an enormous capital would be required to purchase land for this purpose! How greatly would it increase the cost of bleaching to pay interest upon this capital, or to hire so much land in England! This expense would scarcely have been felt in Germany. Beside the diminished expense, the cotton stuffs bleached with chlorine suffer less in the hands of skilful workmen than those bleached in the sun; and already the peasantry in some parts of Germany have adopted it, and find it advantageous.

Another use to which cheap muriatic acid is applied, is the manufacture of glue from bones. Bone contains from 30 to 36 per cent. of earthy matter—chiefly phosphate of lime, and the remainder is gelatine. When bones are digested in muriatic acid, they become transparent and flexible like leather, the earthy matter is dissolved, and after the acid is all carefully washed away, pieces of glue of the same shape as the bones remain, which are soluble in hot water and adapted to all the purposes of ordinary glue, without further preparation.

Another important application of sulphuric acid

may be adduced, namely, to the refining of silver and the separation of gold, which is always present in some proportion in native silver. Silver, as it is usually obtained from mines in Europe, contains, in 16 ounces, 6 to 8 ounces of copper. When used by the silversmith, or in coining, 16 ounces must contain in Germany 13 ounces of silver, in England about $14\frac{1}{2}$. But this alloy is always made artificially, by mixing pure silver with the due proportion of the copper; and for this purpose the silver must be obtained pure by the refiner. This he formerly effected by amalgamation, or by roasting it with lead; and the cost of this process was about 2*l.* for every hundred weight of silver. In the silver so prepared, about $\frac{1}{1200}$ to $\frac{1}{2000}$th part of gold remained. To effect the separation of this by nitric hydrochloric acid was more expensive than the value of the gold; it was therefore left in utensils, or circulated in coin, valueless. The copper, too, of the native silver was of no use whatever. But the $\frac{1}{1000}$th part of gold, being about one and one half per cent. of the value of the silver, now covers the cost of refining, and affords an adequate profit to the refiner; so that he effects the separation of the copper, and returns to his employer the whole amount of the pure silver, as well as the copper, without demanding any payment: he is amply remunerated

by that minute portion of gold. The new process of refining is a most beautiful chemical operation. The granulated metal is boiled in concentrated sulphuric acid, which dissolves both the silver and the copper, leaving the gold nearly pure, in the form of a black powder. The solution is then placed in a leaden vessel containing metallic copper; this is gradually dissolved, and the silver precipitated in a pure metallic state. The sulphate of copper is also a valuable product, being employed in the manufacture of green and blue pigments.

Other immediate results of the economical production of sulphuric acid, are the general employment of phosphorus matches, and of stearine candles—that beautiful substitute for tallow and wax. Twenty-five years ago, the present prices and extensive applications of sulphuric and muriatic acids, of soda, phosphorus, &c., would have been considered utterly impossible. Who is able to foresee what new and unthought-of chemical productions, ministering to the service and comforts of mankind, the next twenty-five years may produce?

After these remarks you will perceive that it is no exaggeration to say, we may fairly judge of the commercial prosperity of a country from the amount of sulphuric acid it consumes. Reflecting

upon the important influence which the price of sulphur exercises upon the cost of production of bleached and printed cotton stuffs, soap, glass, &c., and remembering that Great Britain supplies America, Spain, Portugal, and the East, with these, exchanging them for raw cotton, silk, wine, raisins, indigo, &c., &c., we can understand why the English Government should have resolved to resort to war with Naples, in order to abolish the sulphur monopoly, which the latter power attempted recently to establish. Nothing could be more opposed to the true interests of Sicily than such a monopoly ; indeed, had it been maintained a few years, it is highly probable that sulphur, the source of her wealth, would have been rendered perfectly valueless to her. Science and industry form a power to which it is dangerous to present impediments. It was not difficult to perceive that the issue would be the entire cessation of the exportation of sulphur from Sicily. In the short period the sulphur monopoly lasted, fifteen patents were taken out for methods to obtain back the sulphuric acid used in making soda. Admitting that these fifteen experiments were not perfectly successful, there can be no doubt it would ere long have been accomplished. But then, in gypsum (sulphate of lime), and in heavy-spar (sulphate of barytes), we possess mountains of sulphuric acid ;

in galena (sulphate of lead), and in iron pyrites, we have no less abundance of sulphur. The problem is, how to separate the sulphuric acid, or the sulphur, from these native stores. Hundreds of thousands of pounds weight of sulphuric acid were prepared from iron pyrites, while the high price of sulphur consequent upon the monopoly lasted. We should probably ere long have triumphed over all difficulties, and have separated it from gypsum. The impulse has been given, the possibility of the process proved, and it may happen in a few years that the inconsiderate financial speculation of Naples may deprive her of that lucrative commerce. In like manner Russia, by her prohibitory system, has lost much of her trade in tallow and potash. One country purchases only from absolute necessity from another, which excludes her own productions from her markets. Instead of the tallow and linseed oil of Russia, Great Britain now uses palm oil and cocoa-nut oil of other countries. Precisely analogous is the combination of workmen against their employers, which has led to the construction of many admirable machines for superseding manual labor. In commerce and industry every imprudence carries with it its own punishment; every oppression immediately and sensibly recoils upon the head of those from whom it emanates.

## LETTER IV.

My dear sir One of the most influential causes of improvement in the social condition of mankind is that spirit of enterprise which induces men of capital to adopt and carry out suggestions for the improvement of machinery, the creation of new articles of commerce, or the cheaper production of those already in demand; and we can not but admire the energy with which such men devote their talents, their time, and their wealth, to realize the benefits of the discoveries and inventions of science. For even when they are expended upon objects wholly incapable of realization—nay, even when the idea which first gave the impulse proves in the end to be altogether impracticable or absurd, immediate good to the community generally ensues; some useful and perhaps unlooked-for result flows directly, or springs ultimately, from exertions frustrated in their main design. Thus it is also in the pursuit of science. Theories lead to experiments and investigations; and he who inves-

tigates will scarcely ever fail of being rewarded by discoveries. It may be, indeed, the theory sought to be established is entirely unfounded in nature; but while searching in a right spirit for one thing, the inquirer may be rewarded by finding others far more valuable than those which he sought.

At the present moment, electro-magnetism, as a moving power, is engaging great attention and study; wonders are expected from its application to this purpose. According to the sanguine expectations of many persons, it will shortly be employed to put into motion every kind of machinery, and among other things it will be applied to impel the carriages of railroads, and this at so small a cost, that expense will no longer be matter of consideration. England is to lose her superiority as a manufacturing country, inasmuch as her vast store of coals will no longer avail her as an economical source of motive power. "We," say the German cultivators of this science, "have cheap zinc, and, how small a quantity of this metal is required to turn a lathe, and consequently to give motion to any kind of machinery!"

Such expectations may be very attractive, and yet they are altogether illusory! they will not bear the test of many simple calculations; and this our friends have not troubled themselves to institute

With a simple flame of spirits of wine, under a proper vessel containing boiling water, a small carriage of 200 to 300 pounds weight can be put into motion, or a weight of 80 to 100 pounds may be raised to a height of 20 feet. The same effects may be produced by dissolving zinc in dilute sulphuric acid in a certain apparatus. This is certainly an astonishing and highly interesting discovery; but the question to be determined is, which of the two processes is the least expensive?

In order to answer this question, and to judge correctly of the hopes entertained from this discovery, let me remind you of what chemists denominate "equivalents." These are certain unalterable ratios of effects which are proportionate to each other, and may therefore be expressed in numbers. Thus, if we require 8 pounds of oxygen to produce a certain effect, and we wish to employ chlorine for the same effect, we must employ neither more nor less than $35\frac{1}{2}$ pounds weight. In the same manner, 6 pounds weight of coal are equivalent to 32 pounds weight of zinc. The numbers representing chemical equivalents express very general ratios of effects, comprehending for all bodies all the actions they are capable of producing.

If zinc be combined in a certain manner with another metal, and submitted to the action of dilute

sulphuric acid, it is dissolved in the form of an oxide ; it is in fact burned at the expense of the oxygen contained in the fluid. A consequence of this action is the production of an electric current which, if conducted through a wire, renders it magnetic. In thus effecting the solution of a pound weight, for example, of zinc, we obtain a definite amount of force adequate to raise a given weight one inch, and to keep it suspended ; and the amount of weight it will be capable of suspending will be the greater the more rapidly the zinc is dissolved.

By alternately interrupting and renewing the contact of the zinc with the acid, and by very simple mechanical arrangements, we can give to the iron an upward and downward or a horizontal motion, thus producing the conditions essential to the motion of any machinery.

This moving force is produced by the oxidation of the zinc ; and, setting aside the name given to the force in this case, we know that it can be produced in another manner. If we burn the zinc under the boiler of a steam-engine, consequently in the oxygen of the air, instead of the galvanic pile, we should produce steam, and by it a certain amount of force. If we should assume (which, however, is not proved), that the quantity of force is unequal in these cases—that, for instance, we

had obtained double or triple the amount in the galvanic pile, or that in this mode of generating force less loss is sustained—we must still recollect the equivalents of zinc and coal, and make these elements of our calculation. According to the experiments of Despretz, 6 pounds weight of zinc, in combining with oxygen, develop no more heat than 1 pound of coal; consequently, under equal conditions, we can produce six times the amount of force with a pound of coal as with a pound of zinc. It is therefore obvious that it would be more advantageous to employ coal instead of zinc, even if the latter produced four times as much force in a galvanic pile, as an equal weight of coal by its combustion under a boiler. Indeed it is highly probable, that if we burn under the boiler of a steam-engine the quantity of coal required for smelting the zinc from its ores, we shall produce far more force than the whole of the zinc so obtained could originate in any form of apparatus whatever.

Heat, electricity, and magnetism, have a similar relation to each other as the chemical equivalents of coal, zinc, and oxygen. By a certain measure of electricity we produce a corresponding proportion of heat or of magnetic power; we obtain that electricity by chemical affinity, which in one shape produces heat, in another electricity or magnetism. A certain amount of affinity produces an

equivalent of electricity in the same manner as, on the other hand, we decompose equivalents of chemical compounds by a definite measure of electricity. The magnetic force of the pile is therefore limited to the extent of the chemical affinity, and in the case before us is obtained by the combination of the zinc and sulphuric acid. In the combustion of coal, the heat results from, and is measured by, the affinity of the oxygen of the atmosphere for that substance.

It is true that, with a very small expense of zinc, we can make an iron wire a magnet capable of sustaining a thousand pounds weight of iron: let us not allow ourselves to be misled by this. Such a magnet could not raise a single pound weight of iron two inches, and therefore could not impart motion. The magnet acts like a rock, which while at rest presses with a weight of a thousand pounds upon a basis: it is like an enclosed lake, without an outlet and without a fall. But it may be said, we have, by mechanical arrangements, given it an outlet and a fall. True; and this must be regarded as a great triumph of mechanics; and I believe it is susceptible of further improvements, by which greater force may be obtained. But with every conceivable advantage of mechanism, no one will dispute that one pound of coal, under the boiler of a steam-engine, will give motion to a mass several

hundred times greater than a pound of zinc in the galvanic pile.

Our experience of the employment of electro-magnetism as a motory power is, however, too recent to enable us to foresee the ultimate results of contrivances to apply it; and, therefore, those who have devoted themselves to solve the problem of its application should not be discouraged, inasmuch as it would undoubtedly be a most important achievement to supersede the steam-engine, and thus escape the danger of railroads, even at double their expense.

Professor Weber of Göttingen has thrown out a suggestion, that if a contrivance could be devised to enable us to convert at will the wheels of the steam-carriage into magnets, we should be enabled to ascend and descend acclivities with great facility. This notion may ultimately be, to a certain extent, realized.

The employment of the galvanic pile as a motory power, however, must, like every other contrivance, depend upon the question of its relative economy: probably some time hence it may so far succeed as to be adopted in certain favorable localities; it may stand in the same relation to steam power as the manufacture of beet sugar bears to that of cane, or as the production of gas from oils and resins to that from mineral coal.

The history of beet-root sugar affords us an excellent illustration of the effect of prices upon commercial productions. This branch of industry seems at length, as to its processes, to be perfected. The most beautiful white sugar is now manufactured from the beet-root, in the place of the treacle-like sugar, having the taste of the root, which was first obtained; and instead of 3 or 4 per cent., the proportion obtained by Achard, double or even treble that amount is now produced. And notwithstanding the perfection of the manufacture, it is probable it will ere long be in most places entirely discontinued. In the years 1824 to 1827, the prices of agricultural produce were much lower than at present, while the price of sugar was the same. At that time one malter* of wheat was 10*s*., and one klafter† of wood 18*s*., and land was falling in price. Thus, food and fuel were cheap, and the demand for sugar unlimited; it was, therefore, advantageous to grow beet-root, and to dispose of the produce of land as sugar. All these circumstances are now different. A malter of wheat costs 18*s*.; a klafter of wood, 30*s*. to 36*s*. Wages have risen, but not in proportion, while the price of colonial sugar has fallen. Within the limits of the German

* Malter—a measure containing several bushels, but varying in different countries.

† Klafter—a cord, a stack, measuring six feet every way.

commercial league, as, for instance, at Frankfort-on-the-Maine, a pound of the whitest and best loaf sugar is 7*d.*; the import duty is $3\frac{2}{3}d.$, or 30*s.* per cwt., leaving $3\frac{1}{3}d.$ as the price of the sugar. In the year 1827, then, one malter of wheat was equal to 40 lbs. weight of sugar, while at present that quantity of wheat is worth 70 lbs. of sugar. If indeed fuel were the same in price as formerly, and 70 lbs. of sugar could be obtained from the same quantity of the root as then yielded 40 lbs., it might still be advantageously produced; but the amount, if now obtained by the most approved methods of extraction, falls far short of this; and as fuel is double the price, and labor dearer, it follows that, at present, it is far more advantageous to cultivate wheat and to purchase sugar.

There are, however, other elements which must enter into our calculations; but these serve to confirm our conclusion that the manufacture of beet-root sugar as a commercial speculation must cease. The leaves and residue of the root, after the juice was expressed, were used as food for cattle, and their value naturally increased with the price of grain. By the process formerly pursued, 75 lbs. weight of juice were obtained from 100 lbs. of beet-root, and gave 5 lbs. of sugar. The method of Schützenbach, which was eagerly adopted by the manufacturers, produced from the same quantity

of root 8 lbs. of sugar; but it was attended with more expense to produce, and the loss of the residue as food for cattle. The increased expense in this process arises from the larger quantity of fuel required to evaporate the water; for instead of merely evaporating the juice, the dry residue is treated with water, and we require fuel sufficient to evaporate 106 lbs. of fluid instead of 75 lbs., and the residue is only fit for manure. The additional 3 lbs. of sugar are purchased at the expense of much fuel, and the loss of the residue as an article of food.

If the valley of the Rhine possessed mines of diamonds as rich as those of Golconda, Visiapoor, or the Brazils, they would probably not be worth the working: at those places the cost of extraction is 28*s*. to 30*s*. the carat. With us it amounts to three or four times as much—to more, in fact, than diamonds are worth in the market. The sand of the Rhine contains gold; and in the Grand Dutchy of Baden many persons are occupied in gold-washing when wages are low; but as soon as they rise, this employment ceases. The manufacture of sugar from beet-root, in like manner, twelve to fourteen years ago, offered advantages which are now lost: instead, therefore, of maintaining it at a great sacrifice, it would be more reasonable, more in accordance with true natural economy, to cultivate

other and more valuable productions, and with them purchase sugar. Not only would the state be a gainer, but every member of the community. This argument does not apply, perhaps, to France and Bohemia, where the prices of fuel and of colonial sugar are very different to those in Germany.

The manufacture of gas for lighting, from coals, resin, and oils, stands with us on the same barren ground.

The materials from which gas is manufactured in England bears a direct proportion to the price of corn; there the prices of tallow and oil are twice as great as in Germany, but iron and coal are two thirds cheaper; and even in England the manufacture of gas is only advantageous when the other products of the distillation of coal, the coke, etc., can be sold.

It would certainly be esteemed one of the greatest discoveries of the age if any one could succeed in condensing coal gas into a white, dry, solid, odorless substance, portable, and capable of being placed upon a candlestick, and burned in a lamp. Wax, tallow, and oil, are combustible gases in a solid or fluid form, which offer many advantages for lighting, not performed by gas: they furnish, in well-constructed lamps, as much light, without requiring the expensive apparatus necessary for the combustion of gas, and they are generally more

economical. In large towns, or such establishments as hotels, where coke is in demand, and where losses in stolen tallow or oil must be considered, together with the labor in snuffing candles and cleaning lamps, the higher price of gas is compensated. In places where gas can be manufactured from resin, oil of turpentine, and other cheap oil, as at Frankfort, this is advantageous so long as it is pursued on a small scale only. If large towns were lighted in the same manner, the materials would rise in price: the whole amount at present produced would scarcely suffice for two such towns as Berlin and Munich. But no just calculation can be made from the present prices of turpentine, resin, &c., which are not produced upon any large scale.

## LETTER V.

My dear sir: Until very recently it was supposed that the physical qualities of bodies, that is, hardness, color, destiny, transparency, &c., and still more their chemical properties, must depend upon the nature of their elements, or upon their composition. It was tacitly received as a principle, that two bodies containing the same elements in the same proportion, must of necessity possess the same properties. We could not imagine an exact identity of composition, giving rise to two bodies entirely different in their sensible appearance and chemical relations. The most ingenious philosophers entertained the opinion that chemical combination is an inter-penetration of the particles of different kinds of matter, and that all matter is susceptible of infinite division. This has proved to be altogether a mistake. If matter were infinitely divisible in this sense, its particles must be imponderable, and a million of such molecules could not weigh more than an infinitely small one.

But the particles of that imponderable matter, which, striking upon the retina, gives us the sensation of light, are not in a mathematical sense infinitely small.

Inter-penetration of elements in the production of a chemical compound, supposes two distinct bodies, A and B, to occupy one and the same space at the same time. If this were so, different properties could not exist with an equal and identical composition.

That hypothesis, however, has shared the fate of innumerable imaginative explanations of natural phenomena, in which our predecessors indulged. They have now no advocate. The force of truth dependant upon observation is irresistible. A great many substances have been discovered among organic bodies, composed of the same elements in the same relative proportions, and yet exhibiting physical and chemical properties perfectly distinct one from another. To such substances the term *Isomeric* (from ισος *equal* and μερος *part*) is applied. A great class of bodies known as the volatile oils, oil of turpentine, essence of lemons, oil of balsam, of copaiba, oil of rosemary, oil of juniper, and many others, differing widely from each other in their odor, in their medicinal effects, in their boiling point, in their specific gravity, &c., are exactly identical in composition,

—they contain the same elements, carbon and hydrogen, in the same proportions.

How admirably simple does the chemistry of organic nature present itself to us from this point of view. An extraordinary variety of compound bodies produced with equal weights of two elements! and how wide their dissimilarity! The crystallized part of the oil of roses, the delicious fragrancy of which is so well known, a solid at ordinary temperatures, although readily volatile, is a compound body containing exactly the same elements, and in the same proportion, as the gas we employ for lighting our streets; and, in short, the same elements, in the same relative quantities, are found in a dozen other compounds, all differing essentially in their physical and chemical properties.

These remarkable truths, so highly important in their applications, were not received and admitted as sufficiently established, without abundant proofs. Many examples have long been known where the analysis of two different bodies gave the same composition; but such cases were regarded as doubtful: at any rate, they were isolated observations, homeless in the realms of science, until, at length, examples were discovered of two or more bodies, whose absolute identity of composition, with totally distinct properties, could be

demonstrated in a more obvious and conclusive manner than by mere analysis; that is, they can be converted and reconverted into each other without addition and without subtraction.

In cyanuric acid, hydrated cyanic acid, and cy amelide, we have three such isomeric compounds

Cyanuric acid is crystalline, soluble in water and capable of forming salts with metallic oxides

Hydrated cyanic acid is a volative and highly blistering fluid, which can not be brought into contact with water, without being instantaneously decomposed.

Cyamelide is a white substance very like porcelain, absolutely insoluble in water.

Now if we place the first,—cyanuric acid,—in a vessel hermetically sealed, and apply a high degree of heat, it is converted by its influence into hydrated cyanic acid; and, then, if this is kept for some time at the common temperature, it passes into cyamelide, no other element being present. And, again inversely, cyamelide can be converted into cyanuric acid and hydrated cyanic acid.

We have three other bodies which pass through similar changes, in aldehyde, metaldehyde, and eltaldehyde; and, again two, in urea and cyanuret of ammonia. Further, 100 parts of aldehyde hydrated butyric acid and acetic ether contain the same elements in the same proportion. Thus one

substance may be converted into another without addition or subtraction, and without the participation of any foreign bodies in the change.

The doctrine that matter is not infinitely divisible, but on the contrary, consists of atoms incapable of further division, alone furnishes us with a satisfactory explanation of these phenomena. In chemical combinations, the ultimate atoms of bodies do not penetrate each other, they are only arranged side by side in a certain order, and the properties of the compound depend entirely upon this order. If they are made to change their place—their mode of arrangement—by an impulse from without, they combine again in a different manner, and another compound is formed with totally different properties. We may suppose that one atom combines with one atom of another element to form a compound atom, while in other bodies, two and two, four and four, eight and eight, are united; so that in all such compounds the amount per cent. of the elements is absolutely equal; and yet their physical and chemical properties must be totally different, the constitution of each atom being peculiar, in one body consisting of two, in another of four, in the third of eight, and in a fourth of sixteen simple atoms.

The discovery of these facts immediately led to many most beautiful and interesting results; they

furnished us with a satisfactory explanation of observations which were before veiled in mystery —a key to many of nature's most curious recesses

Again, solid bodies, whether simple or compound, are capable of existing in two states, which are known by the terms *amorphous* and *crystalline*.

When matter is passing from a gaseous or liquid state slowly into a solid, an incessant motion is observed, as if the molecules were minute magnets; they are seen to repel each other in one direction, and to attract and cohere together in another, and in the end become arranged into a regular form, which, under equal circumstances, is always the same for any given kind of matter; that is, crystals are formed.

Time and freedom of motion for the particles of bodies are necessary to the formation of crystals. If we force a fluid or a gas to become suddenly solid, leaving no time for its particles to arrange themselves, and cohere in that direction in which the cohesive attraction is strongest, no crystals will be formed, but the resulting solid will have a different color, a different degree of hardness and cohesion, and will refract light differently; in one word, will be *amorphous*. Thus we have cinnabar as a red and a jet-black substance; sulphur a fixed and brittle body, and soft, semitransparent

and ductile; glass as a milk-white opaque substance, so hard that it strikes fire with steel, and in its ordinary and well-known state. These dissimilar states and properties of the same body are occasioned in one case by a regular, in the other by an irregular arrangement of its atoms; one is crystalline, the other amorphous.

Applying these facts to natural productions, we have reason to believe that clay-slate and many kinds of greywacke are amorphous feldspar, as transition limestone is amorphous marble, basalt and lava mixtures of amorphous zeolite and augite. Anything that influences the cohesion, must also in a certain degree alter the properties of bodies. Carbonate of lime, if crystallized at ordinary temperatures, possesses the crystalline form, hardness, and refracting power of common spar; if crystallized at a higher temperature, it has the form and properties of arragonite.

Finally, *Isomorphism* or the equality of form of many chemical compounds having a different composition, tends to prove that matter consists of atoms the mere arrangement of which produces all the properties of bodies. But when we find that a *different arrangement* of the *same* elements gives rise to *various* physical and chemical properties, and a *similar arrangement* of *different* elements produces properties very much the *same*, may we

not inquire whether some of those bodies which we regard as elements may not be merely modifications of the same substance? whether they are not the same matter in a different state of arrangement? We know in fact the existence of iron in two states, so dissimilar, that in the one, it is to the electric chain like platinum, and in the other it is like zinc; so that powerful galvanic machines have been constructed of this one metal.

Among the elements are several instances of remarkable similarity of properties. Thus there is a strong resemblance between platinum and iridium; bromine and iodine; iron, manganese and magnesium; cobalt and nickel; phosphorus and arsenic; but this resemblance consists mainly in their forming isomorphous compounds in which these elements exist in the same relative proportion. These compounds are similar, because the atoms of which they are composed are arranged in the same manner. The converse of this is also true: nitrate of strontia becomes quite dissimilar to its common state if a certain proportion of water is taken into its composition.

If we suppose selenium to be merely modified sulphur and phosphorus, modified arsenic, how does it happen, we must inquire, that sulphuric acid and selenic acid, phosphoric and arsenic acid, respectively form compounds which it is impossible

to distinguish by their form and solubility? Were these merely isomeric they ought to exhibit properties quite dissimilar!

We have not, I believe, at present the remotest ground to suppose that any one of those substances which chemists regard as elements can be converted into another. Such a conversion, indeed, would presuppose that the element was composed of two or more ingredients, and was in fact not an element; and until the decomposition of these bodies is accomplished, and their constituents discovered, all pretensions to such conversions deserve no notice.

Mr. Brown of Edinburgh thought he had converted iron into rhodium, and carbon or paracyanogen into silicon. His paper upon this subject was published in the Transactions of the Royal Society of Edinburgh, and contained internal evidence, without a repetition of his experiments, that he was totally unacquainted with the principles of chemical analysis. But his experiments have been carefully repeated by qualified persons, and they have completely proved his ignorance: *his* rhodium is iron, and *his* silicon an impure incombustible coal.

## LETTER VI.

My dear sir: One of the most remarkable effects of the recent progress of science is the alliance of chemistry with physiology, by which a new and unexpected light has been thrown upon the vital processes of plants and animals. We have now no longer any difficulty in understanding the different actions of aliments, poisons, and remedial agents—we have a clear conception of the causes of hunger, of the exact nature of death; and we are not, as formerly, obliged to content ourselves with a mere description of their symptoms. It is now ascertained with positive certainty, that all the substances which constitute the food of man must be divided into two great classes, one of which serves for the nutrition and reproduction of the animal body, while the other ministers to quite different purposes. Thus starch, gum, sugar, beer, wine, spirits, &c., furnish no element capable of entering into the composition of blood, muscular fibre, or any part which is the seat of the vital principle. It must surely be universally interesting to trace the great change our views have

undergone upon these subjects, as well as to become acquainted with the researches from which our present knowledge is derived.

The primary conditions of the maintenance of animal life, are a constant supply of certain matters, animal food, and of oxygen, in the shape of atmospheric air. During every moment of life, oxygen is absorbed from the atmosphere in the organs of respiration, and the act of breathing can not cease while life continues.

The observations of physiologists have demonstrated that the body of an adult man supplied abundantly with food neither increases nor diminishes in weight during twenty-four hours, and yet the quantity of oxygen absorbed into his system, in that period, is very considerable. According to the experiments of Lavoisier, an adult man takes into his system from the atmosphere, in one year, no less than 746 pounds weight of oxygen; the calculations of Menzies make the quantity amount even to 837 pounds; but we find his weight at the end of the year either exactly the same, or differing one way or other by at most a few pounds. What, it may be asked, has become of the enormous amount of oxygen thus introduced into the human system in the course of one year? We can answer this question satisfactorily. No part of the oxygen remains in the body, but is

given out again, combined with carbon and hydrogen. The carbon and hydrogen of certain parts of the animal body combine with the oxygen introduced through the lungs and skin, and pass off in the forms of carbonic acid and vapor of water. At every expiration and every moment of life, a certain amount of its elements are separated from the animal organism, having entered into combination with the oxygen of the atmosphere.

In order to obtain a basis for an approximate calculation, we may assume, with Lavoisier and Seguin, that an adult man absorbs into his system $32\frac{1}{2}$ ounces of oxygen daily—that is, 46,037 cubic inches = 15,661 grains, French weight; and further, that the weight of the whole mass of his blood is 24 pounds, of which 80 per cent. is water. Now, from the known composition of the blood, we know that in order to convert its whole amount of carbon and hydrogen into carbonic acid and water 64.102 grains of oxygen are required. This quantity will be taken into the system in four days and five hours. Whether the oxygen enters into combination directly with the elements of the blood, or with the carbon and hydrogen of other parts of the body, it follows inevitably—the weight of the body remaining unchanged and in a normal condition—that as much of these elements as will suffice to supply 24 pounds of blood, must be

taken into the system in four days and five hours; and this necessary amount is furnished by the food.

We have not, however, remained satisfied with mere approximation: we have determined accurately, in certain cases, the quantity of carbon taken daily in the food, and of that which passes out of the body in the fæces and urine combined—that is, uncombined with oxygen; and from these investigations it appears that an adult man, taking moderate exercise, consumes $13\frac{9}{10}$ ounces of carbon, which pass off through the skin and lungs as carbonic acid gas.*

It requires 37 ounces of oxygen to convert $13\frac{9}{10}$ of carbon into carbonic acid. Again: according to the analysis of Boussingault (Annales de Chim. et de Phys., lxx. i., p. 136), a horse consumes $79\frac{1}{10}$ ounces of carbon in twenty-four hours, a milch cow $70\frac{3}{4}$ ounces; so that the horse

* This account is deduced from observations made upon the average daily consumption of about 30 soldiers in barracks. The food of these men, consisting of meat, bread, potatoes, lentiles, peas, beans, butter, salt, pepper, &c., was accurately weighed during a month, and each article subjected to ultimate analysis. Of the quantity of food, beer, and spirits, taken by the men when out of barracks, we have a close approximation from the report of the sergeant; and from the weight and analysis of the fæces and urine, it appears that the carbon which passes off through these channels may be considered equivalent to the amount taken in that portion of the food, and of sour-crout, which was not included in the estimate.

requires 13 pounds $3\frac{1}{2}$ ounces, and the cow 11 pounds $10\frac{3}{4}$ ounces of oxygen.*

As no part of the oxygen taken into the system of an animal is given off in any other form than combined with carbon or hydrogen, and as in a normal condition, or state of health, the carbon and hydrogen so given off are replaced by those elements in the food, it is evident that the amount of nourishment required by an animal for its support must be in a direct ratio with the quantity of oxygen taken into its system. Two animals which in equal times take up by means of the lungs and skin unequal quantities of oxygen, consume an amount of food unequal in the same ratio. The consumption of oxygen in a given time may be expressed by the number of respirations; it is therefore obvious, that in the same animal the quantity of nourishment required must vary with the force and number of respirations. A child breathes quicker than an adult, and consequently requires food more frequently and proportionably in larger quantity, and bears hunger less easily. A bird deprived of food dies on the third day, while a serpent, confined under a bell, respires so slowly that the quantity of carbonic acid generated in an hour can scarcely be observed, and it will live three months, or longer, without food.

* 16 ounces = $\frac{1}{2}$ kilogramme.

The number of respirations is fewer in a state of rest than during labor or exercise; the quantity of food necessary in both cases must be in the same ratio. An excess of food, a want of a due amount of respired oxygen, or of exercise, as also great exercise (which obliges us to take an increased supply of food), together with weak organs of digestion, are incompatible with health.

But the quantity of oxygen received by an animal through the lungs not only depends upon the number of respirations, but also upon the temperature of the respired air. The size of the thorax of an animal is unchangeable; we may therefore regard the volume of air which enters at every inspiration as uniform. But its weight, and consequently the amount of oxygen it contains, is not constant. Air is expanded by heat, and contracted by cold—an equal volume of hot and cold air contains, therefore, an unequal amount of oxygen. In summer, atmospheric air contains water in the form of vapor; it is nearly deprived of it in winter. The volume of oxygen in the same volume of air is smaller in summer than in winter. In summer and winter, at the pole and at the equator, we inspire an equal volume of air; the cold air is warmed during respiration, and acquires the temperature of the body. In order, therefore, to introduce into the lungs a given amount of oxygen, less expendi

ture of force is necessary in winter than in summer, and for the same expenditure of force more oxygen is inspired in winter. It is also obvious that in an equal number of respirations we consume more oxygen at the level of the sea than on a mountain.

The oxygen taken into the system is given out again in the same form, both in summer and winter; we expire more carbon at a low than at a high temperature, and require more or less carbon in our food in the same proportion; and consequently more is respired in Sweden than in Sicily, and in our own country an eighth more in winter than in summer. Even if an equal weight of food is consumed in hot and cold climates, Infinite Wisdom has ordained that very unequal proportions of carbon shall be taken in it. The food prepared for the inhabitants of southern climes does not contain in a fresh state more than 12 per cent. of carbon, while the blubber and train oil which feed the inhabitants of polar regions contain 66 to 80 per cent. of that element.

From the same cause it is comparatively easy to be temperate in warm climates, or to bear hunger for a long time under the equator; but cold and hunger united very soon produce exhaustion.

The oxygen of the atmosphere received into the blood in the lungs, and circulated throughout every part of the animal body, acting upon the elements of the food, is the source of *animal heat.*

## LETTER VII.

My dear sir: The source of animal heat, its laws, and the influence it exerts upon the functions of the animal body, constitute a curious and highly interesting subject, to which I would now direct your attention.

All living creatures, whose existence depends upon the absorption of oxygen, possess within themselves a source of heat, independent of surrounding objects.

This general truth applies to all animals, and extends to the seed of plants in the act of germination, to flower-buds when developing, and fruits during their maturation.

In the animal body, heat is produced only in those parts to which arterial blood, and with it the oxygen absorbed in respiration, is conveyed. Hair, wool, and feathers, receive no arterial blood, and therefore in them no heat is developed. The combination of a combustible substance with oxygen is, under all circumstances, the only source of animal heat. In whatever way carbon may combine with oxygen, the act of combination is

accompanied by the disengagement of heat. It is indifferent whether this combination takes place rapidly or slowly, at a high or at a low temperature ; the amount of heat liberated is a constant quantity.

The carbon of the food being converted into carbonic acid within the body, must give out exactly as much heat as if it had been directly burnt in oxygen gas or in common air ; the only difference is, the production of the heat is diffused over unequal times. In oxygen gas the combustion of carbon is rapid, and the heat intense ; in atmo spheric air it burns slower and for a longer time, the temperature being lower ;. in the animal body the combination is still more gradual, and the heat is lower in proportion.

It is obvious that the amount of heat liberated must increase or diminish with the quantity of oxygen introduced in equal times by respiration. Those animals therefore which respire frequently, and consequently consume much oxygen, possess a higher temperature than others, which, with a body of equal size to be heated, take into the system less oxygen. The temperature of a child (102°) is higher than that of an adult (99.5°). That of birds (104° to 105.4°) is higher than that of quadrupeds (98.5° to 100.4°) or than that of fishes or amphibia, whose proper temperature is from

2.7° to 3.6° higher than that of the medium in which they live. All animals, strictly speaking, are warm-blooded; but in those only which possess lungs is the temperature of the body quite independent of the surrounding medium.

The most trustworthy observations prove that in all climates, in the temperate zones, as well as at the equator or the poles, the temperature of the body in man, and in what are commonly called warm-blooded animals, is invariably the same; yet how different are the circumstances under which they live!

The animal body is a heated mass, which bears the same relation to surrounding objects as any other heated mass. It receives heat when the surrounding objects are hotter, it loses heat when they are colder than itself.

We know that the rapidity of cooling increases with the difference between the temperature of the heated body and that of the surrounding medium; that is, the colder the surrounding medium the shorter the time required for the cooling of the heated body.

How unequal, then, must be the loss of heat in a man at Palermo, where the external temperature is nearly equal to that of the body, and in the polar regions, where the external temperature is from 70 to 90 degrees lower!

Yet, notwithstanding this extremely unequal loss of heat, experience has shown that the blood of the inhabitant of the arctic circle has a temperature as high as that of the native of the south, who lives in so different a medium.

This fact, when its true significance is perceived, proves that the heat given off to the surrounding medium is restored within the body with great rapidity. This compensation must consequently take place more rapidly in winter than in summer, at the pole than at the equator.

Now, in different climates the quantity of oxygen introduced into the system by respiration, as has been already shown, varies according to the temperature of the external air; the quantity of inspired oxygen increases with the loss of heat by external cooling, and the quantity of carbon or hydrogen necessary to combine with this oxygen must be increased in the same ratio.

It is evident that the supply of the heat lost by cooling is effected by the mutual action of the elements of the food and the inspired oxygen, which combine together. To make use of a familiar, but not on that account a less just illustration, the animal body acts, in this respect, as a furnace, which we supply with fuel. It signifies nothing what intermediate forms food may assume, what changes it may undergo in the body, the last

change is uniformly the conversion of its carbon into carbonic acid, and of its hydrogen into water. The unassimilated nitrogen of the food, along with the unburned or unoxidized carbon, is expelled in the urine or in the solid excrements. In order to keep up in the furnace a constant temperature, we must vary the supply of fuel according to the external temperature, that is, according to the supply of oxygen.

In the animal body the food is the fuel; with a proper supply of oxygen we obtain the heat given out during its oxidation or combustion. In winter, when we take exercise in a cold atmosphere, and when consequently the amount of inspired oxygen increases, the necessity for food containing carbon and hydrogen increases in the same ratio; and by gratifying the appetite thus excited, we obtain the most efficient protection against the most piercing cold. A starving man is soon frozen to death. The animals of prey in the arctic regions, as every one knows, far exceed in voracity those of the torrid zone.

In cold and temperate climates, the air, which incessantly strives to consume the body, urges man to laborious efforts in order to furnish the means of resistance to its action, while, in hot climates, the necessity of labor to provide food is far less urgent.

Our clothing is merely an equivalent for a cer-

tain amount of food. The more warmly we are clothed the less urgent becomes the appetite for food, because the loss of heat by cooling, and consequently the amount of heat to be supplied by the food, is diminished.

If we were to go naked, like certain savage tribes, or if in hunting or fishing we were exposed to the same degree of cold as the Samoyedes, we should be able with ease to consume 10 pounds of flesh, and perhaps a dozen of tallow candles into the bargain, daily, as warmly clad travellers have related with astonishment of these people. We should then also be able to take the same quantity of brandy or train oil without bad effects, because the carbon and hydrogen of these substances would only suffice to keep up the equilibrium between the external temperature and that of our bodies.

According to the preceding expositions, the quantity of food is regulated by the number of respirations, by the temperature of the air, and by the amount of heat given off to the surrounding medium.

No isolated fact, apparently opposed to this statement, can affect the truth of this natural law. Without temporary or permanent injury to health, the Neapolitan can not take more carbon and hydrogen in the shape of food than he expires as carbonic acid and water; and the Esquimaux can

not expire more carbon and hydrogen than he takes into the system as food, unless in a state of disease or of starvation. Let us examine these states a little more closely.

The Englishman in Jamaica perceives with regret the disappearance of his appetite, previously a source of frequently recurring enjoyment; and he succeeds by the use of cayenne pepper and the most powerful stimulants, in enabling himself to take as much food as he was accustomed to eat at home. But the whole of the carbon thus introduced into the system is not consumed; the temperature of the air is too high, and the oppressive heat does not allow him to increase the number of respirations by active exercise, and thus to proportion the waste to the amount of food taken; disease of some kind, therefore, ensues.

On the other hand, England sends her sick to southern regions, where the amount of the oxygen inspired is diminished in a very large proportion. Those whose diseased digestive organs have in a greater or less degree lost the power of bringing the food into the state best adapted for oxidation, and therefore are less able to resist the oxidising influence of the atmosphere of their native climate. obtain a great improvement in health. The diseased organs of digestion have power to place the diminished amount of food in equilibrium with the

inspired oxygen, in the mild climate; while in a colder region the organs of respiration themselves would have been consumed in furnishing the necessary resistance to the action of the atmospheric oxygen.

In our climate, hepatic diseases, or those arising from excess of carbon, prevail in summer; in winter, pulmonary diseases, or those arising from excess of oxygen are more frequent.

The cooling of the body, by whatever cause it may be produced, increases the amount of food necessary. The mere exposure to the open air, in a carriage or on the deck of a ship, by increasing radiation and vaporisation, increases the loss of heat, and compels us to eat more than usual. The same is true of those who are accustomed to drink large quantities of cold water, which is given off at the temperature of the body, 98.5 degrees. It increases the appetite, and persons of weak constitution find it necessary, by continued exercise, to supply to the system the oxygen required to restore the heat abstracted by the cold water. Loud and long continued speaking, the crying of infants, moist air, all exert a decided and appreciable influence on the amount of food which is taken.

We have assumed that it is especially carbon and hydrogen which, by combining with oxygen, serve to produce animal heat. In fact, observa-

tion proves that the hydrogen of the food plays a not less important part than the carbon.

The whole process of respiration appears most clearly developed, when we consider the state of a man, or other animal, totally deprived of food.

The first effect of starvation is the disappearance of fat, and this fat can not be traced either in the urine or in the scanty fæces. Its carbon and hydrogen have been given off through the skin and lungs in the form of oxidized products; it is obvious that they have served to support respiration.

In the case of a starving man, $32\frac{1}{2}$ oz. of oxygen enter the system daily, and are given out again in combination with a part of his body. Currie mentions the case of an individual who was unable to swallow, and whose body lost 100 lbs. in weight during a month; and, according to Martell (Trans. Linn. Soc., vol. xi., p. 411), a fat pig, overwhelmed in a slip of earth, lived 160 days without food, and was found to have diminished in weight, in that time, more than 120 lbs. The whole history of hybernating animals, and the well-established facts of the periodical accumulation, in various animals, of fat which, at other periods, entirely disappears, prove that the oxygen, in the respiratory process, consumes, without exception, all such substances as are capable of entering into combination with it. It combines with whatever is presented to it;

and the deficiency of hydrogen is the only reason why carbonic acid is the chief product; for, at the temperature of the body, the affinity of hydrogen for oxygen far surpasses that of carbon for the same element.

We know, in fact, that the graminivora expire a volume of carbonic acid equal to that of the oxygen inspired, while the carnivora, the only class of animals whose food contains fat, inspire more oxygen than is equal in volume to the carbonic acid expired. Exact experiments have shown, that in many cases only half the volume of oxygen is expired in the form of carbonic acid. These observations can not be gainsaid, and are far more convincing than those arbitrary and artificially produced phenomena, sometimes called experiments; experiments which, made as too often they are, without regard to the necessary and natural conditions, possess no value, and may be entirely dispensed with; especially when, as in the present case, nature affords the opportunity for observation, and when we make a rational use of that opportunity.

In the progress of starvation, however, it is not only the fat which disappears, but also, by degrees, all such of the solids as are capable of being dissolved. In the wasted bodies of those who have suffered starvation, the muscles are shrunk and

unnaturally soft, and have lost their contractility; all those parts of the body which were capable of entering into the state of motion have served to protect the remainder of the frame from the destructive influence of the atmosphere. Toward the end, the particles of the brain begin to undergo the process of oxidation, and delirium, mania, and death close the scene; that is to say, all resistance to the oxidising power of the atmospheric oxygen ceases, and the chemical process of eremacausis, or decay, commences, in which every part of the body, the bones excepted, enters into combination with oxygen.

The time which is required to cause death by starvation depends on the amount of fat in the body, on the degree of exercise, as in labor or exertion of any kind, on the temperature of the air, and finally, on the presence or absence of water. Through the skin and lungs there escapes a certain quantity of water, and as the presence of water is essential to the continuance of the vital motions, its dissipation hastens death. Cases have occurred, in which a full supply of water being accessible to the sufferer, death has not occurred till after the lapse of twenty days. In one case, life was sustained in this way for the period of sixty days.

In all chronic diseases death is produced by the

same cause, namely, the chemical action of the atmosphere. When those substances are wanting, whose function in the organism is to support the process of respiration; when the diseased organs are incapable of performing their proper function of producing these substances; when they have lost the power of transforming the food into that shape in which it may, by entering into combination with the oxygen of the air, protect the system from its influence, then, the substance of the organs themselves, the fat of the body, the substance of the muscles, the nerves, and the brain, are unavoidably consumed. The true cause of death in these cases is the respiratory process, that is, the action of the atmosphere.

A deficiency of food, and a want of power to convert the food into a part of the organism, are both, equally, a want of resistance; and this is the negative cause of the cessation of the vital process. The flame is extinguished, because the oil is consumed; and it is the oxygen of the air which has consumed it.

In many diseases substances are produced which are incapable of assimilation. By the mere deprivation of food, these substances are removed from the body without leaving a trace behind; their elements have entered into combination with the oxygen of the air.

From the first moment that the function of the lungs or of the skin is interrupted or disturbed, compounds, rich in carbon, appear in the urine, which acquires a brown color. Over the whole surface of the body oxygen is absorbed, and combines with all the substances which offer no resistance to it. In those parts of the body where the access of oxygen is impeded; for example, in the arm-pits, or in the soles of the feet, peculiar compounds are given out, recognisable by their appearance, or by their odor. These compounds contain much carbon.

Respiration is the falling weight—the bent spring, which keeps the clock in motion; the inspirations and expirations are the strokes of the pendulum which regulate it. In our ordinary time-pieces, we know with mathematical accuracy the effect produced on their rate of going, by changes in the length of the pendulum, or in the external temperature. Few, however, have a clear conception of the influence of air and temperature on the health of the human body; and yet the research into the conditions necessary to keep it in the normal state, is not more difficult than in the case of a clock.

## LETTER VIII.

My dear sir: Having attempted in my last letter to explain to you the simple and admirable office subserved by the oxygen of the atmosphere in its combination with carbon in the animal body, I will now proceed to present you with some remarks upon those materials which sustain its mechanisms in motion, and keep up their various functions—namely, the Aliments.

If the increase of mass in an animal body, the development and reproduction of its organs depend upon the blood, then those substances only which are capable of being converted into blood can be properly regarded as nourishment. In order then to ascertain what parts of our food are nutritious, we must compare the composition of the blood with the composition of the various articles taken as food.

Two substances require especial consideration as the chief ingredients of the blood; one of these separates immediately from the blood when it is withdrawn from the circulation.

It is well known that in this case blood coagulates, and separates into a yellowish liquid, the *serum* of the blood, and a gelatinous mass, which adheres to a rod or stick in soft, elastic fibres, when coagulating blood is briskly stirred. This is the *fibrine* of the blood, which is identical in all its properties with muscular fibre, when the latter is purified from all foreign matters.

The second principal ingredient of the blood is contained in the serum, and gives to this liquid all the properties of the white of eggs, with which it is indeed identical. When heated, it coagulates into a white elastic mass, and the coagulating substance is called *albumen*.

Fibrine and albumen, the chief ingredients of blood, contain, in all, seven chemical elements, among which nitrogen, phosphorus, and sulphur, are found. They contain also the earth of bones. The serum retains in solution sea salt and other salts of potash and soda, in which the acids are carbonic, phosphoric, and sulphuric acids. The globules of the blood contain fibrine and albumen, along with a red coloring matter, in which iron is a constant element. Beside these, the blood contains certain fatty bodies in small quantity, which differ from ordinary fats in several of their properties.

Chemical analysis has led to the remarkable

result, that fibrine and albumen contain the same organic elements united in the same proportion—that is, that they are *isomeric*, their chemical composition—the proportion of their ultimate elements—being identical. But the difference of their external properties shows that the particles of which they are composed are arranged in a different order. (See *ante*, page 56).

This conclusion has lately been beautifully confirmed by a distinguished physiologist (Dénis), who has succeeded in converting fibrine into albumen; that is, in giving it the solubility, and coagulability by heat, which characterize the white of egg.

Fibrine and albumen, beside having the same composition, agree also in this, that both dissolve in concentrated muriatic acid, yielding a solution of an intense purple color. This solution, whether made with fibrine or albumen, has the very same reactions with all substances yet tried.

Both albumen and fibrine, in the process of nutrition, are capable of being converted into muscular fibre, and muscular fibre is capable of being reconverted into blood. These facts have long been established by physiologists, and chemistry has merely proved that these metamorphorses can be accomplished under the influence of a certain force, without the aid of a third substance, or of its elements, and without the addition of any for-

eign element, or the separation of any element previously present in these substances.

If we now compare the composition of all organized parts with that of fibrine and albumen, the following relations present themselves:

All parts of the animal body which have a decided shape, which form parts of organs, contain nitrogen. No part of an organ which possesses motion and life is destitute of nitrogen; all of them contain likewise carbon and the elements of water; the latter, however, in no case in the proportion to form water.

The chief ingredients of the blood contain nearly 17 per cent. of nitrogen, and from numerous analyses it appears that no part of an organ contains less than 17 per cent. of nitrogen.

The most convincing experiments and observations have proved that the animal body is absolutely incapable of producing an elementary body, such as carbon or nitrogen, out of substances which do not contain it; and it obviously follows, that all kinds of food fit for the production either of blood, or of cellular tissue, membranes, skin, hair, muscular fibre, &c., must contain a certain amount of nitrogen, because that element is essential to the composition of the above-named organs; because the organs can not create it from the other elements presented to them; and, finally, because

no nitrogen is absorbed from the atmosphere in the vital process.

The substance of the brain and nerves contains a large quantity of albumen, and, in addition to this, two peculiar fatty acids, distinguished from other fats by containing phosphorus (phosphoric acid). One of these contains nitrogen (Frémy).

Finally, water and common fat are those ingredients of the body which are destitute of nitrogen. Both are amorphous, or unorganized, and only so far take part in the vital process as that their presence is required for the due performance of the vital functions. The inorganic constituents of the body are iron, lime, magnesia, common salt, and the alkalies.

The nutritive process is seen in its simplest form in carnivorous animals. This class of animals lives on the blood and flesh of the graminivora; but this blood and flesh are, in all their properties, identical with their own. Neither chemical nor physiological differences can be discovered.

The nutriment of carnivorous animals is derived originally from blood; in their stomach it becomes dissolved, and capable of reaching all other parts of the body; in its passage it is again converted into blood, and from this blood are reproduced all those parts of their organization which have undergone change or metamorphosis.

With the exception of hoofs, hair, feathers, and the earth of bones, every part of the food of carnivorous animals is capable of assimilation.

In a chemical sense, therefore, it may be said that a carnivorous animal, in supporting the vital process, consumes itself. That which serves for its nutrition is identical with those parts of its organization which are to be renewed.

The process of nutrition in graminivorous animals appears at first sight altogether different. Their digestive organs are less simple, and their food consists of vegetables, the great mass of which contains but little nitrogen.

From what substances, it may be asked, is the blood formed, by means of which their organs are developed? This question may be answered with certainty.

Chemical researches have shown, that all such parts of vegetables as can afford nutriment to animals contain certain constituents which are rich in nitrogen; and the most ordinary experience proves that animals require for their support and nutrition less of these parts of plants in proportion as they abound in the nitrogenized constituents. Animals can not be fed on matters destitute of these nitrogenized constituents.

These important products of vegetation are especially abundant in the seeds of the different kinds

of grain, and of peas, beans, and lentils; in the roots and the juices of what are commonly called vegetables. They exist, however, in all plants, without exception, and in every part of plants in larger or smaller quantity.

These nitrogenized forms of nutriment in the vegetable kingdom may be reduced to three substances, which are easily distinguished by their external characters. Two of them are soluble in water, the third is insoluble.

When the newly-expressed juices of vegetables are allowed to stand, a separation takes place in a few minutes. A gelatinous precipitate, commonly of a green tinge, is deposited, and this, when acted on by liquids which remove the coloring matter, leaves a grayish white substance, well known to druggists as the deposite from vegetable juices. This is one of the nitrogenized compounds which serves for the nutrition of animals, and has been named *vegetable fibrine*. The juice of grapes is especially rich in this constituent, but it is most abundant in the seeds of wheat, and of the cerealia generally. It may be obtained from wheat flour by a mechanical operation, and in a state of tolerable purity; it is then called *gluten*, but the glutinous property belongs, not to vegetable fibrine, but to a foreign substance, present in small quantity, which is not found in the other cerealia.

The method by which it is obtained sufficiently proves that it is insoluble in water; although we can not doubt that it was originally dissolved in the vegetable juice, from which it afterward separated, exactly as fibrine does from blood.

The second nitrogenized compound remains dissolved in the juice after the separation of the fibrine. It does not separate from the juice at the ordinary temperature, but is instantly coagulated when the liquid containing it is heated to the boiling point.

When the clarified juice of nutritious vegetables, such as cauliflower, asparagus, mangel-wurzel, or turnips, is made to boil, a coagulum is formed, which it is absolutely impossible to distinguish from the substance which separates as a coagulum, when the serum of blood, or the white of an egg, diluted with water, are heated to the boiling point. This is *vegetable albumen*. It is found in the greatest abundance in certain seeds, in nuts, almonds, and others, in which the starch of the gramineæ is replaced by oil.

The third nitrogenized constituent of the vegetable food of animals is *vegetable caseine*. It is chiefly found in the seeds of peas, beans, lentils, and similar leguminous seeds. Like vegetable albumen, it is soluble in water, but differs from it in this, that its solution is not coagulated by heat.

When the solution is heated or evaporated, a skin forms on its surface, and the addition of an acid causes a coagulum, just as in animal milk.

These three nitrogenized compounds, vegetable fibrine, albumen, and caseine, are the true nitrogenized constituents of the food of graminivorous animals; all other nitrogenized compounds occurring in plants, are either rejected by animals, as in the case of the characteristic principles of poisonous and medicinal plants, or else they occur in the food in such very small proportion, that they can not possibly contribute to the increase of mass in the animal body.

The chemical analysis of these three substances has led to the very interesting result that they contain the same organic elements, united in the same proportion by weight; and, what is still more remarkable, that they are identical in composition with the chief constituents of blood, animal fibrine, and albumen. They all three dissolve in concentrated muriatic acid with the same deep purple color, and even in their physical characters, animal fibrine and albumen are in no respect different from vegetable fibrine and albumen. It is especially to be noticed, that by the phrase, identity of composition, we do not here intend mere similarity, but that even in regard to the presence and relative amount of sulphur, phosphorus, and

phosphate of lime, no difference can be observed. How beautifully and admirably simple, with the aid of these discoveries, appears the process of nutrition in animals, the formation of their organs, in which vitality chiefly resides! Those vegetable principles, which in animals are used to form blood, contain the chief constituents of blood, fibrine and albumen, ready formed, as far as regards their composition. All plants, besides, contain a certain quantity of iron, which reappears in the coloring matter of the blood. Vegetable fibrine and animal fibrine, vegetable albumen and animal albumen, hardly differ, even in form; if these principles be wanting in the food, the nutrition of the animal is arrested; and when they are present, the graminivorous animal obtains in its food the very same principles on the presence of which the nutrition of the carnivora entirely depends.

Vegetables produce in their organism the blood of all animals, for the carnivora, in consuming the blood and flesh of the graminivora, consume, strictly speaking, only the vegetable principles which have served for the nutrition of the latter. Vegetable fibrine and albumen take the same form in the stomach of the graminivorous animal as animal fibrine and albumen do in that of the carnivorous animal.

From what has been said, it follows that the

velopment of the animal organism and its growth are dependant on the reception of certain principles identical with the chief constituents of blood.

In this sense we may say that the animal organism gives to blood only its form; that it is incapable of creating blood out of other substances which do not already contain the chief constituents of that fluid. We can not, indeed, maintain, that the animal organism has no power to form other compounds, for we know that it is capable of producing an extensive series of compounds, differing in composition from the chief constituents of blood; but these last, which form the starting-point of the series, it can not produce.

The animal organism is a higher kind of vegetable, the development of which begins with those substances with the production of which the life of an ordinary vegetable ends. As soon as the latter has borne seed, it dies, or a period of its life comes to a termination.

In that endless series of compounds, which begins with carbonic acid, ammonia, and water, the sources of the nutrition of vegetables, and includes the most complex constituents of the animal brain, there is no blank, no interruption. The first substance capable of affording nutriment to animals is the last product of the creative energy of vegetables.

The substance of cellular tissue and of membranes, of the brain and nerves, these the vegetable can not produce.

The seemingly miraculous in the productive agency of vegetables disappears in a great degree, when we reflect that the production of the constituents of blood can not appear more surprising than the occurrence of the fat of beef and mutton in cocoa beans, of human fat in olive-oil, of the principal ingredient of butter in palm oil, and of horse fat and train-oil in certain oily seeds.

## LETTER IX.

My dear sir: The facts detailed in my last letter will satisfy you as to the manner in which the increase of mass in an animal, that is its growth, is accomplished; we have still to consider a most important question, namely, the function performed in the animal system by substances destitute of nitrogen; such as sugar, starch, gum, pectine, &c.

The most extensive class of animals, the graminivora, can not live without these substances; their food must contain a certain amount of one or more of them, and if these compounds are not supplied, death quickly ensues.

This important inquiry extends also to the constituents of the food of carnivorous animals in the earliest periods of life; for this food also contains substances which are not necessary for their support in the adult state. The nutrition of the young of carnivora is obviously accomplished by means similar to those by which the graminivora are nourished; their development is dependant on

the supply of a fluid, which the body of the mother secretes in the shape of milk.

Milk contains only one nitrogenised constituent, known under the name of *caseine*: besides this, its chief ingredients are butter (fat), and sugar of milk. The blood of the young animal, its muscular fibre, cellular tissue, nervous matter, and bones, must have derived their origin from the nitrogenised constituent of milk—the caseine; for butter and sugar of milk contain no nitrogen.

Now, the analysis of caseine has led to the result, which, after the details I have given, can hardly excite your surprise, that this substance also is identical in composition with the chief constituents of blood, fibrine and albumen. Nay more—a comparison of its properties with those of vegetable caseine has shown—that these two substances are identical in all their properties; insomuch, that certain plants, such as peas, beans, and lentils, are capable of producing the same substance which is formed from the blood of the mother, and employed in yielding the blood of the young animal.

The young animal, therefore, receives, in the form of caseine—which is distinguished from fibrine and albumen by its great solubility, and by not coagulating when heated—the chief constituent of the mother's blood. To convert caseine into

blood no foreign substance is required, and in the conversion of the mother's blood into caseine, no elements of the constituents of the blood have been separated. When chemically examined, caseine is found to contain a much larger proportion of the earth of bones than blood does, and that in a very soluble form, capable of reaching every part of the body. Thus, even in the earliest period of its life, the development of the organs, in which vitality resides, is, in the carnivorous animal, dependant on the supply of a substance, identical in organic composition with the chief constituents of its blood.

What, then, is the use of the butter and the sugar of milk? How does it happen that these substances are indispensable to life?

Butter and sugar of milk contain no fixed bases, no soda or potash. Sugar of milk has a composition closely allied to that of the other kinds of sugar, of starch, and of gum; all of them contain carbon and the elements of water, the latter precisely in the proportion to form water.

There is added, therefore, by means of these compounds, to the nitrogenized constituents of food, a certain amount of carbon; or, as in the case of butter, of carbon and hydrogen; that is, an excess of elements, which car not possibly be employed in the production of blood, because the nitrogenized substances contained in the food al

ready contain exactly the amount of carbon which is required for the production of fibrine and albumen.

The following considerations will show that hardly a doubt can be entertained, that this excess of carbon alone, or of carbon and hydrogen, is expended in the production of animal heat, and serves to protect the organism from the action of the atmospheric oxygen, which is required for the production of fibrine and albumen.

In an adult carnivorous animal, which neither gains nor loses weight, perceptibly, from day to day, its nourishment, the waste of organized tissue, and its consumption of oxygen, stand to each other in a well-defined and fixed relation.

The carbon of the carbonic acid given off, with that of the urine ; the nitrogen of the urine, and the hydrogen given off as ammonia and water; these elements, taken together, must be exactly equal in weight to the carbon, nitrogen, and hydrogen of the metamorphosed tissues, and since these last are exactly replaced by the food, to the carbon, nitrogen, and hydrogen of the food. Were this not the case, the weight of the animal could not possibly remain unchanged.

But, in the young of the carnivora, the weight does not remain unchanged ; on the contrary, it increases from day to day by an appreciable quantity.

This fact presupposes, that the assimilative process in the young animal is more energetic, more intense, than the process of transformation in the existing tissues. If both processes were equally active, the weight of the body could not increase; and were the waste by transformation greater, the weight of the body would decrease.

Now, the circulation in the young animal is not weaker, but, on the contrary, more rapid; the respirations are more frequent; and, for equal bulks, the consumption of oxygen must be greater rather than smaller in the young than in the adult animal. But, since the metamorphosis of organized parts goes on more slowly, there would ensue a deficiency of those substances, the carbon and hydrogen of which are adapted for combination with oxygen, because, in the carnivora, it is the new compounds, produced by the metamorphosis of organized parts, which nature has destined to furnish the necessary resistance to the action of the oxygen, and to produce animal heat. What is wanting for these purposes an Infinite Wisdom has supplied to the young animal in its natural food.

The carbon and hydrogen of butter, and the carbon of the sugar of milk, no part of either of which can yield blood, fibrine, or albumen, are destined for the support of the respiratory process, at an age when a greater resistance is opposed to

the metamorphosis of existing organisms; or, in other words, to the production of compounds, which, in the adult state, are produced in quantity amply sufficient for the purpose of respiration.

The young animal receives the constituents of its blood in the caseine of the milk. A metamorphosis of existing organs goes on, for bile and urine are secreted; the matter of the metamorphosed parts is given off in the form of urine, of carbonic acid, and of water; but the butter and sugar of milk also disappear; they can not be detected in the fæces.

The butter and sugar of milk are given out in the form of carbonic acid and water, and their conversion into oxidized products furnishes the clearest proof that far more oxygen is absorbed than is required to convert the carbon and hydrogen of the metamorphosed tissues into carbonic acid and water.

The change and metamorphosis of organized tissues going on in the vital process in the young animal, consequently yield, in a given time, much less carbon and hydrogen in the form adapted for the respiratory process than corresponds to the oxygen taken up in the lungs. The substance of its organized parts would undergo a more rapid consumption, and would necessarily yield to the action of the oxygen, were not the deficiency

of carbon and hydrogen supplied from another source.

The continued increase of mass, or growth, and the free and unimpeded development of the organs in the young animal, are dependant on the presence of foreign substances, which, in the nutritive process, have no other function than to protect the newly-formed organs from the action of the oxygen. It is the elements of these substances which unite with the oxygen; the organs themselves could not do so without being consumed; that is, growth, or increase of mass in the body—the consumption of oxygen remaining the same—would be utterly impossible.

The preceding considerations leave no doubt as to the purpose for which Nature has added to the food of the young of carnivorous mammalia substances devoid of nitrogen, which their organism can not employ for nutrition, strictly so called, that is, for the production of blood; substances which may be entirely dispensed with in their nourishment in the adult state. In the young of carnivorous birds, the want of all motion is an obvious cause of diminished waste in the organized parts; hence, milk is not provided for them.

The nutritive process in the carnivora thus presents itself under two distinct forms; one of which we again meet with in the graminivora.

In graminivorous animals, we observe that during their whole life, their existence depends on a supply of substances having a composition identical with that of sugar of milk, or closely resembling it. Everything that they consume as food contains a certain quantity of starch, gum, or sugar, mixed with other matters.

The function performed in the vital process of the graminivora by these substances is indicated in a very clear and convincing manner, when we take into consideration the very small relative amount of the carbon which these animals consume in the nitrogenized constituents of their food, which bears no proportion whatever to the oxygen absorbed through the skin and lungs.

A horse, for example, can be kept in perfectly good condition, if he obtain as food 15 lbs. of hay and $4\frac{1}{2}$ lbs. of oats, daily. If we now calculate the whole amount of nitrogen in these matters, as ascertained by analysis (1.5 per cent. in the hay, 2.2 per cent. in the oats), in the form of blood, that is, as fibrine and albumen, with the due proportion of water in blood (80 per cent.), the horse receives daily no more than $4\frac{1}{2}$ oz. of nitrogen, corresponding to about 8 lbs. of blood. But along with this nitrogen, that is, combined with it in the form of fibrine or albumen, the animal receives only about $14\frac{1}{2}$ oz. of carbon.

Without going further into the calculation, it will readily be admitted, that the volume of air inspired and expired by a horse, the quantity of oxygen consumed, and, as a necessary consequence, the amount of carbonic acid given out by the animal, is much greater than in the respiratory process in man. But an adult man consumes daily about 14 oz. of carbon, and the determination of Boussingault, according to which a horse expires 79 oz. daily, can not be very far from the truth.

In the nitrogenized constituents of his food, therefore, the horse receives rather less than the fifth part of the carbon which his organism requires for the support of the respiratory process; and we see that the wisdom of the Creator has added to his food the $\frac{4}{5}$ths which are wanting, in various forms as, starch, sugar, &c., with which the animal must be supplied, or his organism will be destroyed by the action of the oxygen.

It is obvious, that, in the system of the graminivora, whose food contains so small a portion, relatively, of the constituents of blood, the process of metamorphosis in existing tissues, and consequently their restoration or reproduction, must go on far less rapidly than in the carnivora. Were this not the case, a vegetation a thousand times more luxuriant than the actual one would not suffice for their nourishment. Sugar, gum, and starch,

would no longer be necessary to support life in these animals, because, in that case, the products of the waste, or metamorphosis of the organized tissues, would contain enough of carbon to support the respiratory process.

## LETTER X.

My dear sir: Let me now apply the principles announced in the preceding letters to the circumstances of our own species. Man, when confined to animal food, requires for his support and nourishment extensive sources of food, even more widely extended than the lion and tiger, because, when he has the opportunity, he kills without eating.

A nation of hunters, on a limited space, is utterly incapable of increasing its numbers beyond a certain point, which is soon attained. The carbon necessary for respiration must be obtained from the animals, of which only a limited number can live on the space supposed. These animals collect from plants the constituents of their organs and of their blood, and yield them, in turn, to the savages who live by the chase alone. They, again, receive this food unaccompanied by those compounds, destitute of nitrogen, which, during the life of the animals, served to support the respiratory process. In such men, confined to an animal

diet, it is the carbon of the flesh and of the blood which must take the place of starch and sugar.

But 15 lbs. of flesh contain no more carbon than 4 lbs. of starch, and while the savage with one animal and an equal weight of starch could maintain life and health for a certain number of days, he would be compelled, if confined to flesh alone, in order to procure the carbon necessary for respiration, during the same time, to consume five such animals.

It is easy to see, from these considerations, how close the connexion is between agriculture and the multiplication of the human species. The cultivation of our crops has ultimately no other object than the production of a maximum of those substances which are adapted for assimilation and respiration, in the smallest possible space. Grain and other nutritious vegetables yield us, not only in starch, sugar, and gum, the carbon which protects our organs from the action of oxygen, and produces in the organism the heat which is essential to life, but also in the form of vegetable fibrine, albumen, and caseine, our blood, from which the other parts of our body are developed.

Man, when confined to animal food, respires, like the carnivora, at the expense of the matters produced by the metamorphosis of organized tissues; and, just as the lion, tiger, hyæna, in the cages of

a menagerie, are compelled to accelerate the waste of the organized tissues by incessant motion, in order to furnish the matter necessary for respiration, so the savage, for the very same object, is forced to make the most laborious exertions, and go through a vast amount of muscular exercise. He is compelled to consume force merely in order to supply matter for respiration.

Cultivation is the economy of force. Science teaches us the simplest means of obtaining the *greatest* effect with the *smallest* expenditure of power, and with given means to produce a maximum of force. The unprofitable exertion of power, the waste of force in agriculture, in other branches of industry, in science, or in social economy, is characteristic of the savage state, or of the want of knowledge.

In accordance with what I have already stated, you will perceive that the substances of which the food of man is composed may be divided into two classes; into *nitrogenized* and *non-nitrogenized*. The former are capable of conversion into blood; the latter are incapable of this transformation.

Out of those substances which are adapted to the formation of blood are formed all the organized tissues. The other class of substances, in the normal state of health, serve to support the process of respiration. The former may be called the

*plastic elements of nutrition;* the latter, *elements of respiration.*

Among the former we reckon—

Vegetable fibrine.
Vegetable albumen.
Vegetable caseine.
Animal flesh.
Animal blood.

Among the elements of respiration in our food are—

| | |
|---|---|
| Fat. | Pectine. |
| Starch. | Bassorine. |
| Gum. | Wine. |
| Cane Sugar. | Beer. |
| Grape Sugar. | Spirits. |
| Sugar of milk. | |

The most recent and exact researches have established as a universal fact, to which nothing yet known is opposed, that the nitrogenized constituents of vegetable food have a composition identical with that of the constituents of the blood.

No nitrogenized compound, the composition of which differs from that of fibrine, albumen, and caseine, is capable of supporting the vital process in animals.

The animal organism unquestionably possesses the power of forming, from the constituents of its blood, the substance of its membranes and cellular tissue, of the nerves and brain, and of the organic

part of cartilages and bones. But the blood must be supplied to it ready formed in everything but its form—that is, in its chemical composition. If this be not done, a period is rapidly put to the formation of blood, and consequently to life.

This consideration enables us easily to explain how it happens that the tissues yielding gelatine or chondrine, as, for example, the gelatine of skin or of bones, are not adapted for the support of the vital process; for their composition is different from that of fibrine or albumen. It is obvious that this means nothing more than that those parts of the animal organism which form the blood do not possess the power of effecting a transformation in the arrangement of the elements of gelatine, or of those tissues which contain it. The gelatinous tissues, the gelatine of the bones, the membranes, the cells, and the skin, suffer in the animal body, under the influence of oxygen and moisture, a progressive alteration; a part of these tissues is separated, and must be restored from the blood; but this alteration and restoration is obviously confined within very narrow limits.

While, in the body of a starving or sick individual, the fat disappears, and the muscular tissue takes once more the form of blood, we find that the tendons and membranes retain their natural condition; the limbs of the dead body retain their

connexions, which depend on the gelatinous tissues.

On the other hand, we see that the gelatine of bones devoured by a dog entirely disappears, while only the bone earth is found in his excrements. The same is true of man, when fed on food rich in gelatine, as, for example, strong soup. The gelatine is not to be found either in the urine or in the fæces, and consequently must have undergone a change, and must have served some purpose in the animal economy. It is clear that the gelatine must be expelled from the body in a form different from that in which it was introduced as food.

When we consider the transformation of the albumen of the blood into a part of an organ composed of fibrine, the identity in composition of the two substances renders the change easily conceivable. Indeed we find the change of a dissolved substance into an insoluble organ of vitality, chemically speaking, natural and easily explained, on account of this very identity of composition. Hence the opinion is not unworthy of a closer investigation, that gelatine, when taken in the dissolved state, is again converted, in the body, into cellular tissue, membrane, and cartilage; that it may serve for the reproduction of such parts of these tissues as have been wasted, and for their growth.

And when the powers of nutrition in the whole

body are affected by a change of the health, then, even should the power of forming blood remain the same, the organic force by which the constituents of the blood are transformed into cellular tissue and membranes must necessarily be enfeebled by sickness. In the sick man, the intensity of the vital force, its power to produce metamorphoses, must be diminished as well in the stomach as in all other parts of the body. In this condition, the uniform experience of practical physicians shows that gelatinous matters in a dissolved state exercise a most decided influence on the state of the health. Given in a form adapted for assimilation, they serve to husband the vital force, just as may be done in the case of the stomach, by due preparation of the food in general.

Brittleness in the bones of graminivorous animals is clearly owing to a weakness in those parts of the organism whose function it is to convert the constituents of the blood into cellular tissue and membrane ; and if we can trust to the reports of physicians who have resided in the East, the Turkish women, in their diet of rice, and in the frequent use of enemata of strong soup, have united the conditions necessary for the formation both of cellular tissue and of fat.

## LETTER XI.

My dear sir: In the immense, yet limited expanse of the ocean, the animal and vegetable kingdoms are mutually dependant upon, and successive to, each other. The animals obtain their constituent elements from the plants, and restore them o the water in their original form, when they igain serve as nourishment to a new generation of plants.

The oxygen which marine animals withdraw in their respiration from the air, dissolved in sea-water, is returned to the water by the vital processes of sea plants; that air is richer in oxygen than atmospheric air, containing 32 to 33 per cent., while the latter contains only 21 per cent. Oxygen also combines with the products of the putrefaction of dead animal bodies, changes their carbon into carbonic acid, their hydrogen into water, and their nitrogen assumes again the form of ammonia.

Thus we observe in the ocean a circulation takes place without the addition or subtraction of any element, unlimited in duration, although limited in

extent, inasmuch as in a confined space the nourishment of plants exists in a limited quantity.

We well know that marine plants can not derive a supply of *humus* for their nourishment through their roots. Look at the great sea-tang, the *Fucus Gigantius:* this plant, according to Cook, reaches a height of 360 feet, and a single specimen, with its immense ramifications, nourishes thousands of marine animals; yet its root is a small body, no larger than the fist. What nourishment can this draw from a naked rock, upon the surface of which there is no perceptible change? It is quite obvious that these plants require only a hold—a fastening to prevent a change of place—as a counterpoise to their specific gravity, which is less than that of the medium in which they float. That medium provides the necessary nourishment, and presents it to the surface of every part of the plant. Sea-water contains not only carbonic acid and ammonia, but the alkaline and earthy phosphates and carbonates required by these plants for their growth, and which we always find as constant constituents of their ashes.

All experience demonstrates that the conditions of the existence of marine plants are the same which are essential to terrestial plants. But the latter do not live like sea plants, in a medium which contains all their elements, and surrounds with

appropriate nourishment every part of their organs; on the contrary, they require two media, of which one, namely the soil, contains those essential elements which are absent from the medium surrounding them, that is, the atmosphere.

Is it possible that we could ever be in doubt respecting the office which the soil and its component parts subserve in the existence and growth of vegetables?—that there should have been a time when the mineral elements of plants were not regarded as absolutely essential to their vitality? Has not the same circulation been observed on the surface of the earth, which we have just contemplated in the ocean,—the same incessant change, disturbance and restitution of equilibrium?

Experience in agriculture shows that the production of vegetables on a given surface increases with the supply of certain matters, originally parts of the soil which had been taken up from it by plants—the excrements of man and animals. These are nothing more than matters derived from vegetable food, which in the vital processes of animals, or after their death, assume again the form under which they originally existed, as parts of the soil Now, we know that the atmosphere contains none of these substances, and therefore can replace none; and we know that their removal from a soil de-

stroys its fertility, which may be restored and increased by a new supply.

Is it possible, after so many decisive investigations into the origin of the elements of animals and vegetables, the use of the alkalies, of lime and the phosphates, any doubt can exist as to the principles upon which a rational agriculture depends? Can the art of agriculture be based upon any thing but the restitution of a disturbed equilibrium? Can it be imagined that any country, however rich and fertile, with a flourishing commerce, which for centuries exports its produce in the shape of grain and cattle, will maintain its fertility, if the same commerce does not restore, in some form of manure, those elements which have been removed from the soil, and which can not be replaced by the atmosphere? Must not the same fate await every such country which has actually befallen the once prolific soil of Virginia, now in many parts no longer able to grow its former staple productions —wheat and tobacco?

In the large towns of England the produce both of English and foreign agriculture is largely consumed; elements of the soil indispensable to plants do not return to the fields,—contrivances resulting from the manners and customs of English people, and peculiar to them, render it difficult, perhaps, impossible to collect the enormons quantity of the

phosphates, which are daily, as solid and liquid excrements, carried into the rivers. These phosphates, although present in the soil in the smallest quantity, are its most important mineral constituents. It was observed that many English fields exhausted in that manner, immediately doubled their produce, as if by a miracle, when dressed with bone earth imported from the continent. But if the export of bones from Germany is continued to the extent it has hitherto reached, our soil must be gradually exhausted, and the extent of our loss may be estimated, by considering that one pound of bones contains as much phosphoric acid as a hundred-weight of grain.

The imperfect knowledge of nature, and the properties and relations of matter, possessed by the alchemists, gave rise, in their time, to an opinion that metals as well as plants could be produced from a *seed*. The regular forms and ramifications seen in crystals, they imagined to be the leaves and branches of metal plants; and as they saw the seed of plants grow, producing root, stem and leaves, and again blossoms, fruits and seeds, apparently without receiving any supply of appropriate material, they deemed it worthy of zealous inquiry to discover the *seed* of gold, and the earth necessary for its development. If the metal seeds were once obtained, might they not entertain hopes of their

growth? Such ideas could only be entertained when nothing was known of the atmosphere, and its participation with the earth, in administering to the vital processes of plants and animals. Modern chemistry indeed produces the elements of water, and combining them, forms water anew; but it does not *create* those elements—it derives them from water; the new-formed artificial water has been water before.

Many of our farmers are like the alchemists of old,—they are searching for the miraculous seed—the means, which, without any further supply of nourishment to a soil scarcely rich enough to be sprinkled with indigenous plants, shall produce crops of grain a hundred-fold.

The experience of centuries, nay, of thousands of years, is insufficient to guard men against these fallacies; our only security from these and similar absurdities must be derived from a correct knowledge of scientific principles.

In the first period of natural philosophy organic life was supposed to be derived from water only; afterward, it was admitted that certain elements derived from the air must be superadded to the water; but we *now* know that other elements must be supplied by the earth, if plants are to thrive and multiply.

The amount of materials contained in the atmo-

sphere, suited to the nourishment of plants, is limited; but it must be abundantly sufficient to cover the whole surface of the earth with a rich vegetation. Under the tropics, and in those parts of our globe where the most genial conditions of fertility exist,—a suitable soil, a moist atmosphere, and a high temperature,—vegetation is scarcely limited by space; and, where the soil is wanting, it is gradually supplied by the decaying leaves, bark and branches of plants. It is obvious there is no deficiency of atmospheric nourishment for plants in those regions, nor are these wanting in our own cultivated fields: all which plants require for their development is conveyed to them by the incessant motions of the atmosphere. The air between the tropics contains no more than that of the arctic zones; and yet how different is the amount of produce of an equal surface of land in the two situations!

This is easily explicable. All the plants of tropical climates, the oil and wax palms, the sugar cane, &c., contain only a small quantity of the elements of the blood necessary to the nutrition of animals, as compared with our cultivated plants. The tubers of the potato in Chili, its native country, where the plant resembles a shrub if collected from an acre of land, would scarcely suffice to maintain an Irish family for a single day (Darwin). The result of

cultivation in those plants which serve as food is to produce in them those constituents of the blood. In the absence of the elements essential to these in the soil, starch, sugar, and woody fibre, are perhaps formed; but no vegetable fibrine, albumen, or caseine. If we intend to produce on a given surface of soil more of these latter matters than the plants can obtain from the atmosphere or receive from the soil of the same surface in its uncultivated and normal state, we must *create* an artificial atmosphere, and add the needed elements to the soil.

The nourishment which must be supplied in a given time to different plants, in order to admit a free and unimpeded growth, is very unequal.

On pure sand, on calcareous soil, on naked rocks, only a few genera of plants prosper, and these are, for the most part, perennial plants. They require, for their slow growth, only such minute quantities of mineral substances as the soil can furnish, which may be totally barren for other species. Annual, and especially summer plants, grow and attain their perfection in a comparatively short time, they therefore do not prosper on a soil which is poor in those mineral substances necessary to their development. To attain a maximum in height in the short period of their existence the nourishment contained in the atmosphere is not sufficient. If the end of cultivation is to be obtained we must

create in the soil an artificial atmosphere of carbonic acid and ammonia; and this surplus of nourishment, which the leaves can not appropriate from the air, must be taken up by the corresponding organs, that is, the roots, from the soil. But the ammonia, together with the carbonic acid, are alone insufficient to become part of a plant destined to the nourishment of animals. In the absence of the alkalies, the phosphates and other earthy salts, no vegetable fibrine, no vegetable caseine, can be formed. The phosphoric acid of the phosphate of lime, indispensable to the ceralia and other vegetables in the formation of their seeds, is separated as an excrement, in great quantities, by the rind and barks of ligneous plants.

How different are the evergreen plants, the oleaginous plants, the mosses, the ferns, and the pines, from our annual grasses, the ceralia and leguminous vegetables! The former, at every time of the day during winter and summer, obtain carbon through their leaves by absorbing carbonic acid which is not furnished by the barren soil on which they grow; water is also absorbed and retained by their coriaceous or fleshy leaves with great force. They lose very little by evaporation, compared with other plants. On the other hand, how very small is the quantity of mineral substances which they withdraw from the soil during

their almost constant growth in one year, in comparison with the quantity which one crop of wheat of an equal weight receives in three months!

It is by means of moisture that plants receive the necessary alkalies and salts from the soil. In dry summers a phenomenon is observed, which, when the importance of mineral elements to the life of a plant was unknown, could not be explained. The leaves of plants first developed and perfected, and therefore nearer the surface of the soil, shrivel up and become yellow, lose their vitality, and fall off while the plant is in an active state of growth, without any visible cause. This phenomenon is not seen in moist years, nor in evergreen plants, and but rarely in plants which have long and deep roots, nor is it seen in perennials in autumn and winter.

The cause of this premature decay is now obvious. The perfectly-developed leaves absorb continually carbonic acid and ammonia from the atmosphere, which are converted into elements of new leaves, buds, and shoots; but this metamorphosis can not be effected without the aid of the alkalies, and other mineral substances. If the soil is moist, the latter are continually supplied to an adequate amount, and the plant retains its lively green color; but if this supply ceases from a want of moisture to dissolve the mineral elements, a

separation takes place in the plant itself. The mineral constituents of the juice are withdrawn from the leaves already formed, and are used for the formation of the young shoots; and as soon as the seeds are developed, the vitality of the leaves completely ceases. These withered leaves contain only minute traces of soluble salts, while the buds and shoots are very rich in them.

On the other hand, it has been observed, that where a soil is too highly impregnated with soluble saline materials, these are separated upon the surface of the leaves. This happens to culinary vegetables especially, whose leaves become covered with a white crust. In consequence of these exudations the plant sickens, its organic activity decreases, its growth is disturbed; and if this state continues long, the plant dies. This is most frequently seen in foliaceous plants, the large surfaces of which evaporate considerable quantities of water. Carrots, pumpkins, peas, &c., are frequently thus diseased, when, after dry weather, the plant being near its full growth, the soil is moistened by short showers, followed again by dry weather. The rapid evaporation carries off the water absorbed by the root, and this leaves the salts in the plant in a far greater quantity than it can assimilate. These salts effloresce upon the surface of the leaves, and if they are herbaceous

and juicy, produce an effect upon them as if they had been watered with a solution containing a greater quantity of salts than their organism can bear.

Of two plants of the same species, this disease befalls that which is nearest its perfection; if one should have been planted later, or be more backward in its development, the same external cause which destroys the one will contribute to the growth of the other.

## LETTER XII.

My dear sir: Having now occupied several letters with the attempt to unravel, by means of chemistry, some of the most curious functions of the animal body, and, as I hope, made clear to you the distinctions between the two kinds of constituent elements in food, and the purposes they severally subserve in sustaining life, let me now direct your attention to a scarcely less interesting and equally important subject—the means of obtaining from a given surface of the earth the largest amount of produce adapted to the food of man and animals.

Agriculture is both a science and an art. The knowledge of all the conditions of the life of vegetables, the origin of their elements, and the sources of their nourishment, forms its scientific basis.

From this knowledge we derive certain rules for the exercise of the art, the principles upon which the mechanical operations of farming depend, the usefulness or necessity of these for pre-

paring the soil to support the growth of plants, and for removing every obnoxious influence. No experience, drawn from the exercise of the art, can be opposed to true scientific principles, because the latter should include all the results of practical operations, and are in some instances solely derived therefrom. Theory must correspond with experience, because it is nothing more than the reduction of a series of phenomena to their last causes.

A field in which we cultivate the same plant for several successive years becomes barren for that plant in a period varying with the nature of the soil: in one field it will be in three, in another in seven, in a third in twenty, in a fourth in a hundred years. One field bears wheat, and no peas; another beans and turnips, but no tobacco; a third gives a plentiful crop of turnips, but will not bear clover. What is the reason that a field loses its fertility for one plant, the same which at first flourished there? What is the reason one kind of plant succeeds in a field where another fails?

*These questions belong to Science.*

What means are necessary to preserve to a field its fertility for one and the same plant?—what to render one field fertile for two, for three, for all plants?

*These last questions are put by Art, but they can not be answered by Art.*

If a farmer, without the guidance of just scientific principles, is trying experiments to render a field fertile for a plant which it otherwise will not bear, his prospect of success is very small. Thousands of farmers try such experiments in various directions, the result of which is a mass of practical experience forming a method of cultivation which accomplishes the desired end for certain places; but the same method frequently does not succeed—it indeed ceases to be applicable to a second or third place in the immediate neighborhood. How large a capital, and how much power, are wasted in these experiments! Very different, and far more secure, is the path indicated by SCIENCE; it exposes us to no danger of failing, but, on the contrary, it furnishes us with every guarantee of success. If the cause of failure—of barrenness in the soil for one or two plants—has been discovered, means to remedy it may readily be found.

The most exact observations prove that the method of cultivation must vary with the geognostical condition of the subsoil. In basalt, graywacke, porphyry, sandstone, limestone, &c., are certain elements indispensable to the growth of plants, and the presence of which renders them

fertile. This fully explains the difference in the necessary methods of culture for different places; since it is obvious that the essential elements of the soil must vary with the varieties of composition of the rocks, from the disintegration of which they originated.

Wheat, clover, turnips, for example, each require certain elements from the soil; they will not flourish where the appropriate elements are absent. Science teaches us what elements are essential to every species of plants by an analysis of their ashes. If therefore a soil is found wanting in any of those elements, we discover at once the cause of its barrenness, and its removal may now be readily accomplished.

The empiric attributes all his success to the mechanical operations of agriculture; he experiences and recognises their value, without inquiring what are the causes of their utility, their mode of action: and yet this scientific knowledge is of the highest importance for regulating the application of power and the expenditure of capital—for insuring its economical expenditure and the prevention of waste. Can it be imagined that the mere passing of the ploughshare or the harrow through the soil—the mere contact of the iron—can impart fertility miraculously? Nobody, perhaps, seriously entertains such an opinion. Nevertheless, the

*modus operandi* of these mechanical operations is by no means generally understood. The fact is quite certain, that careful ploughing exerts the most favorable influence: the surface is thus mechanically divided, changed, increased, and renovated; but the ploughing is only auxiliary to the end sought.

In the effects of time, in what in Agriculture are technically called *fallows*—the repose of the fields—we recognise by science certain chemical actions, which are continually exercised by the elements of the atmosphere upon the whole surface of our globe. By the action of its oxygen and its carbonic acid, aided by water, rain, changes of temperature, &c., certain elementary constituents of rocks, or of their ruins, which form the soil capable of cultivation, are rendered soluble in water, and consequently become separable from all their insoluble parts.

These chemical actions, poetically denominated the "the tooth of time," destroy all the works of man, and gradually reduce the hardest rocks to the condition of dust. By their influence the necessary elements of the soil become fitted for assimilation by plants; and it is precisely the end which is obtained by the mechanical operations of farming. They accelerate the decomposition of the soil, in order to provide a new generation

of plants with the necessary elements in a condition favorable to their assimilation. It is obvious that the rapidity of the decomposition of a solid body must increase with the extension of its surface; the more points of contact we offer in a given time to the external chemical agent, the more rapid will be its action.

The chemist, in order to prepare a mineral for analysis, to decompose it, or to increase the solubility of its elements, proceeds in the same way as the farmer deals with his fields—he spares no labor in order to reduce it to the finest powder; he separates the impalpable from the coarser parts by washing, and repeats his mechanical bruising and trituration, being assured his whole process will fail if he is inattentive to this essential and preliminary part of it.

The influence which the increase of surface exercises upon the disintegration of rocks, and upon the chemical action of air and moisture, is strikingly illustrated upon a large scale in the operations pursued in the gold mines of Yaquil, in Chili. These are described in a very interesting manner by Darwin. The rock containing the gold ore is pounded by mills into the finest powder; this is subjected to washing, which separates the lighter particles from the metallic; the gold sinks to the bottom, while a stream of water carries

away the lighter earthy parts into ponds, where it subsides to the bottom as mud. When this deposite has gradually filled up the pond, this mud is taken out and piled in heaps, and left exposed to the action of the atmosphere and moisture. The washing completely removes all the soluble part of the disintegrated rock; the insoluble part, moreover, can not undergo any further change while it is covered with water, and so excluded from the influence of the atmosphere at the bottom of the pond. But being exposed at once to the air and moisture, a powerful chemical action takes place in the whole mass, which becomes indicated by an efflorescence of salts covering the whole surface of the heaps in considerable quantity. After being exposed for two or three years, the mud is again subjected to the same process of washing, and a considerable quantity of gold is obtained, this having been separated by the chemical process of decomposition in the mass. The exposure and washing of the same mud is repeated six or seven times, and at every washing it furnishes a new quantity of gold, although its amount diminishes every time.

Precisely similar is the chemical action which takes place in the soil of our fields; and we accelerate and increase it by the mechanical operations of agriculture. By these we sever and ex-

tend the surface, and endeavor to make every atom of the soil accessible to the action of the carbonic acid and oxygen of the atmosphere. We thus produce a stock of soluble mineral substances, which serve as nourishment to a new generation of plants, and which are indispensable to their growth and prosperity.

## LETTER XIII.

My dear sir: Having in my last letter spoken of the general principles upon which the science and art of agriculture must be based, let me now direct your attention to some of those particulars which will more forcibly exhibit the connexion between chemistry and agriculture, and demonstrate the impossibility of perfecting the important art of rearing food for man and animals without a profound knowledge of our science.

All plants cultivated as food require for their healthy sustenance the alkalies and alkaline earths, each in a certain proportion; and in addition to these, the ceralia do not succeed in a soil destitute of *silica* in a soluble condition. The combinations of this substance found as natural productions, namely, the silicates differ greatly in the degree of facility with which they undergo decomposition, in consequence of the unequal resistance opposed by their integral parts to the dissolving power of the atmospheric agencies. Thus the granite of

Corsica degenerates into a powder in a time which scarcely suffices to deprive the polished granite of Heidelberg of its lustre.

Some soils abound in silicates so readily decomposable, that in every one or two years, as much silicate of potash becomes soluble and fitted for assimilation as is required by the leaves and straw of a crop of wheat. In Hungary, extensive districts are not uncommon where wheat and tobacco have been grown alternately upon the same soil for centuries, the land never receiving back any of those mineral elements which were withdrawn in the grain and straw. On the other hand, there are fields in which the necessary amount of soluble silicate of potash for a single crop of wheat is not separated from the insoluble masses in the soil in less than two, three, or even more years.

The term *fallow*, in Agriculture, designates that period in which the soil, left to the influence of the atmosphere, becomes enriched with those soluble mineral constituents. *Fallow*, however, does not generally imply an entire cessation of cultivation, but only an interval in the growth of the ceralia. That store of silicates and alkalies which is the principal condition of their success is obtained, if potatoes or turnips are grown upon the same fields in the intermediate periods, since these

crops do not abstract a particle of silica, and therefore leave the field equally fertile for the following crop of wheat.

The preceding remarks will render it obvious to you, that the mechanical working of the soil is the simplest and cheapest method of rendering the elements of nutrition contained in it accessible to plants.

But it may be asked, Are there not other means of decomposing the soil besides its mechanical subdivision?—are there not substances, which by their chemical operation shall equally well or better render its constituents suitable for entering into vegetable organisms? Yes: we certainly possess such substances, and one of them, namely, quick-lime, has been employed for the last century past in England for this purpose; and it would be difficult to find a substance better adapted to this service, as it is simple, and in almost all localities cheap and easily accessible.

In order to obtain correct views respecting the effect of quick-lime upon the soil, let me remind you of the first process employed by the chemist when he is desirous of analysing a mineral, and for this purpose wishes to bring its elements into a soluble state. Let the mineral to be examined be, for instance, feldspar; this substance, taken alone, even when reduced to the finest powder, requires

for its solution to be treated with an acid for weeks or months; but if we first mix it with quicklime, and expose the mixture to a moderately strong heat, the lime enters into chemical combination with certain elements of the feldspar, and its alkali (potass) is set free. And now the acid, even without heat, dissolves not only the lime, but also so much of the *silica* of the feldspar as to form a transparent jelly. The same effect which the lime in this process, with the acid of heat, exerts upon the feldspar, it produces when it is mixed with the alkaline argillaceous silicates, and they are for a long time kept together in a moist state.

Common potters' clay, or pipe-clay, diffused through water, and added to milk of lime, thickens immediately upon mixing; and if the mixture is kept for some months, and then treated with acid, the clay becomes gelatinous, which it would not have done without the admixture with the lime. The lime, in combining with the elements of the clay liquefies it; and, what is more remarkable, liberates the greater part of its alkalies. These interesting facts were first observed by Fuchs, at Munich: they have not only led to a more intimate knowledge of the nature and properties of the hydraulic cements, but what is far more important, they explain the effects of caustic lime upon the

soil, and guide the agriculturist in the application of an invaluable means of opening it, and setting free its alkalies—substances so important, nay, so indispensable to his crops.

In the month of October the fields of Yorkshire and Oxfordshire look as if they were covered with snow. Whole square miles are seen whitened over with quicklime, which, during the moist winter months, exercises its beneficial influence upon the stiff, clayey soil, of those counties.

According to the humus theory, quicklime ought to exert the most noxious influence upon the soil, because all organic matters contained in it are destroyed by it, and rendered incapable of yielding their humus to a new vegetation. The facts are indeed directly contrary to this now abandoned theory: the fertility of the soil is increased by the lime.

The ceralia require the alkalies and alkaline silicates, which the action of the lime renders fit for assimilation by the plants. If, in addition to these, there is any decaying organic matter present in the soil supplying carbonic acid, it may facilitate their development; but it is not essential to their growth. If we furnish the soil with ammonia, and the phosphates, which are indispensable to the ceralia, with the alkaline silicates, we have all the conditions necessary to en-

sure an abundant harvest. The atmosphere is an inexhaustible store of carbonic acid.

A no less favorable influence than that of lime is exercised upon the soil of peaty land by the mere act of burning it: this greatly enhances its fertility. We have not long been acquainted with the remarkable change which the properties of clay undergo by burning. The observation was first made in the process of analysing the clay silicates. Many of these, in their natural state, are not acted on by acids, but they become perfectly soluble if heated to redness before the application of the acid. This property belongs to potters' clay, pipe-clay, loam, and many different modifications of clay in soils. In their natural state they may be boiled in concentrated sulphuric acid, without sensible change; but if freely burned, as is done with the pipe-clay in many alum manufactories, they dissolve in the acid with the greatest facility, the contained silica being separated like a jelly in a soluble state. Potters' clay belongs to the most steril kinds of soil, and yet it contains within itself all the constituent elements essential to a most luxurious growth of plants; but their mere presence is insufficient to secure this end. The soil must be accessible to the atmosphere, to its oxygen, to its carbonic acid; — these must penetrate it, in order to secure the conditions necessary

to a happy and vigorous development of the roots The elements present must be brought into that peculiar state of combination which will enable them to enter into plants. Plastic clay is wanting in these properties; but they are imparted to it by a feeble calcination.

At Hardwicke Court, near Gloucester, I have seen a garden (Mr. Baker's) consisting of a stiff clay, which was perfectly steril, become by mere burning extremely fertile. The operation was extended to a depth of three feet. This was an expensive process, certainly; but it was effectual.

The great difference in the properties of burnt and unburnt clay is illustrated by what is seen in brick houses, built in moist situations. In the towns of Flanders, for instance, where most buildings are of brick, efflorescences of salts cover the surfaces of the walls, like a white nap, within a few days after they are erected. If this saline incrustation is washed away by the rain, it soon re-appears; and this is even observed on walls which, like the gateway of Lisle, have been erected for centuries. These saline incrustations consist of carbonates and sulphates, with alkaline bases; and it is well known these act an important part in vegetation. The influence of lime in their production is manifested by their appearing

first at the place where the mortar and brick come into contact.

It will now be obvious to you, that in a mixture of clay with lime, all the conditions exist for the solution of the silicated clay, and the solubility of the alkaline silicates. The lime gradually dissolving in water charged with carbonic acid, acts like milk of lime upon the clay. This explains also the favorable influence which *marl* (by which term all those varieties of clay rich in lime are designated) exerts upon most kinds of soil. There are marly soils which surpass all others in fertility for all kinds of plants; but I believe marl in a burnt state must be far more effective, as well as other materials possessing a similar composition; as, for instance, those species of limestone which are adapted to the preparation of hydraulic cements—for these carry to the soil not only the alkaline bases useful to plants, but also silica in a state capable of assimilation.

The ashes of coals and lignite are also excellent means of ameliorating the soil, and they are used in many places for this purpose. The most suitable may be readily known by their property of forming a gelatinous mass when treated with acids, or by becoming, when mixed with cream of lime, like hydraulic lime—solid and hard as stone.

I have now, I trust, explained to your satisfaction, that the mechanical operations of agriculture —the application of lime and chalk to lands, and the burning of clay—depend upon one and the same scientific principle: they are means of accelerating the decomposition of the alkaline clay silicates, in order to provide plants, at the beginning of a new vegetation, with certain inorganic matters indispensable for their nutrition.

## LETTER XIV.

My dear sir: I treated, in my last letter, of the means of improving the condition of the soil for agricultural purposes by mechanical operations and mineral agents. I have now to speak of the uses and effects of animal exuviæ, and vegetable matters or *manures*—properly so called.

In order to understand the nature of these, and the peculiarity of their influence upon our fields, it is highly important to keep in mind the source whence they are derived.

It is generally known, that if we deprive an animal of food, the weight of its body diminishes during every moment of its existence. If this abstinence is continued for some time, the diminution becomes apparent to the eye; all the fat of the body disappears, the muscles decrease in firmness and bulk, and, if the animal is allowed to die starved, scarcely anything but skin, tendon, and bones, remain. This emaciation which occurs in a body otherwise healthy, demonstrates to us, that during

the life of an animal every part of its living substance is undergoing a perpetual change; all its component parts, assuming the form of lifeless compounds, are thrown off by the skin, lungs, and urinary system, altered more or less by the secretory organs. This change in the living body is intimately connected with the process of respiration; it is, in truth, occasioned by the oxygen of the atmosphere in breathing, which combines with all the various matters within the body. At every inspiration a quantity of oxygen passes into the blood in the lungs, and unites with its elements; but although the weight of the oxygen thus daily entering into the body amounts to 32 or more ounces, yet the weight of the body is not thereby increased. Exactly as much oxygen as is imbibed in inspiration passes off in expiration, in the form of carbonic acid and water; so that with every breath the amount of carbon and hydrogen in the body is diminished. But the emaciation—the loss of weight by starvation—does not simply depend upon the separation of the carbon and hydrogen; but all the other substances which are in combination with these elements in the living tissues pass off in the secretions. The nitrogen undergoes a change, and is thrown out of the system by the kidneys. Their secretion, the urine, contains not only a compound rich in nitrogen, namely urea,

but the sulphur of the tissues in the form of a sulphate, all the soluble salts of the blood and animal fluids, common salt, the phosphates, soda, and potash. The carbon and hydrogen of the blood of the muscular fibre, and of all the animal tissues which can undergo change, return into the *atmosphere*. The nitrogen, and all the soluble inorganic elements, are carried to the *earth* in the urine.

These changes take place in the healthy animal body during every moment of life; a waste and loss of substance proceeds continually; and if this loss is to be restored, and the original weight and substance repaired, an adequate supply of materials must be furnished whence the blood and wasted tissues may be regenerated. This supply is obtained from the food.

In an adult person in a normal or healthy condition, no sensible increase or decrease of weight occurs from day to day. In youth the weight of the body increases, while in old age it decreases. There can be no doubt that in the adult the food has exactly replaced the loss of substance: it has supplied just so much carbon, hydrogen, nitrogen, and other elements, as have passed through the skin, lungs, and urinary organs. In youth the supply is greater than the waste. Part of the elements of the food remain to augment the bulk

of the body. In old age the waste is greater than the supply, and the body diminishes. It is unquestionable, that, with the exception of a certain quantity of carbon and hydrogen, which are secreted through the skin and lungs, we obtain, in the solid and fluid excrements of man and animals, all the elements of their food.

We obtain daily, in the form of urea, all the nitrogen taken in the food both of the young and the adult; and further, in the urine, the whole amount of the alkalies, soluble phosphates and sulphates contained in all the various aliments. In the solid excrements are found all those substances taken in the food which have undergone no alteration in the digestive organs, all indigestible matters, such as woody fibre, the green coloring matter of leaves (chlorophyle), wax, &c.

Physiology teaches us that the process of nutrition in animals, that is, their increase of bulk, or the restoration of wasted parts, proceeds from the blood. The purpose of digestion and assimilation is to convert the food into blood. In the stomach and intestines, therefore, all those substances in the food capable of conversion into blood are separated from its other constituents; in other words, during the passage of the food through the intestinal canal there is a constant absorption of its nitrogen, since only azotized substances are capable

of conversion into blood; and therefore the solid excrements are destitute of that element, except only a small portion, in the constitution of that secretion which is formed to facilitate their passage. With the solid excrements, the phosphates of lime and magnesia, which were contained in the food and not assimilated, are carried off, these salts being insoluble in water, and therefore not entering the urine.

We may obtain a clear insight into the chemical constitution of the solid excrements without further investigation, by comparing the fæces of a dog with his food. We give that animal flesh and bones—substances rich in azotised matter—and we obtain, as the last product of its digestion, a perfectly white excrement, solid while moist, but becoming in the dry air a powder. This is the phosphate of lime of the bones, with scarcely one per cent. of foreign organic matter.

Thus we see that in the solid and fluid excrements of man and animals, all the nitrogen—in short, all the constituent ingredients of the consumed food, soluble and insoluble, are returned; and as food is primarily derived from the fields, we possess in those excrements all the ingredients which we have taken from it in the form of seeds, roots, or herbs.

One part of the crops employed for fattening

sheep and cattle is consumed by man as animal food; another part is taken directly—as flour, potatoes, green vegetables, &c.; a third portion consists of vegetable refuse, and straw employed as litter. None of the materials of the soil need be lost. We can, it is obvious, get back all its constituent parts which have been withdrawn therefrom, as fruits, grain, and animals, in the fluid and solid excrements of man, and the bones, blood and skins of the slaughtered animals. It depends upon ourselves to collect carefully all these scattered elements, and to restore the disturbed equilibrium of composition in the soil. We can calculate exactly how much and which of the component parts of the soil we export in a sheep or an ox, in a quarter of barley, wheat, or potatoes, and we can discover, from the known composition of the excrements of man and animals, how much we have to supply to restore what is lost to our fields.

If, however, we could procure from other sources the substances which give to the exuviæ of man and animals their value in agriculture, we should not need the latter. It is quite indifferent for our purpose whether we supply the ammonia (the source of nitrogen) in the form of urine, or in that of a salt derived from coal-tar; whether we derive the phosphate of lime from bones, apatite, or fossil excrements (the coprolithes).

The principal problem for agriculture is, how to replace those substances which have been taken from the soil, and which can not be furnished by the atmosphere. If the manure supplies an imperfect compensation for this loss, the fertility of a field or of a country decreases; if, on the contrary, more are given to the fields, their fertility increases.

An importation of urine, or of solid excrements, from a foreign country, is equivalent to an importation of grain and cattle. In a certain time, the elements of those substances assume the form of grain, or of fodder, then become flesh and bones enter into the human body, and return again day by day to the form they originally possessed.

The only real loss of elements we are unable to prevent is of the phosphates, and these, in accordance with the customs of all modern nations, are deposited in the grave. For the rest, every part of that enormous quantity of food which a man consumes during his lifetime (say in sixty or seventy years), which was derived from the fields, can be obtained and returned to them. We know with absolute certainty, that in the blood of a young or growing animal there remains a certain quantity of phosphate of lime and of the alkaline phosphates, to be stored up and minister to the growth of the bones and general bulk of the body, and that, with the exception of this very small

quantity, we receive back, in the solid and fluid excrements, all the salts and alkaline bases, all the phosphate of lime and magnesia, and consequently all the inorganic elements which the animal consumes in its food.

We can thus ascertain precisely the quantity, quality, and composition of animal excrements, without the trouble of analyzing them. If we give a horse daily $4\frac{1}{2}$ pounds' weight of oats, and 15 pounds of hay, and knowing that oats give 4 per cent. and hay 9 per cent. of ashes, we can calculate that the daily excrements of the horse will contain 21 ounces of inorganic matter which was drawn from the fields. By analysis we can determine the exact relative amount of silica, of phosphates, and of alkalies, contained in the ashes of the oats and of the hay.

You will now understand that the constituents of the solid parts of animal excrements, and therefore their qualities as manure, must vary with the nature of the creature's food. If we feed a cow upon beetroot, or potatoes, without hay, straw, or grain, there will be no silica in her solid excrements, but there will be phosphate of lime and magnesia. Her fluid excrements will contain carbonate of potash and soda, together with compounds of the same bases with inorganic acids. In one word, we have in the fluid excrements, all the

soluble parts of the ashes of the consumed food; and in the solid excrements, all those parts of the ashes which are insoluble in water.

If the food, after burning, leaves behind ashes containing soluble alkaline phosphates, as is the case with bread, seeds of all kinds, and flesh, we obtain from the animal by which they are consumed a urine holding in solution these phosphates. If, however, the ashes of food contain no alkaline phosphates, but abound in insoluble earthy phosphates, as hay, carrots, and potatoes, the urine will be free from alkaline phosphates, but the earthy phosphates will be found in the fæces. The urine of man, of carnivorous and graminivorous animals, contains alkaline phosphates; that of herbivorous animals is free from these salts.

The analysis of the excrements of man, of the piscivorous birds (as the *guano*), of the horse, and of cattle, furnishes us with the precise knowledge of the salts they contain, and demonstrates, that in those excrements, we return to the fields the ashes of the plants which have served as food—the soluble and insoluble salts and earths indispensable to the development of cultivated plants, and which must be furnished to them by a fertile soil.

There can be no doubt that, in supplying these excrements to the soil, we return to it those constituents which the crops have removed from it,

and we renew its capability of nourishing new crops: in one word, we restore the disturbed equilibrium; and consequently, knowing that the elements of the food derived from the soil enter into the urine and solid excrements of the animals it nourishes, we can with the greatest facility determine the exact value of the different kinds of manure. Thus the excrements of pigs which we have fed with peas and potatoes are principally suited for manuring crops of potatoes and peas. In feeding a cow upon hay and turnips, we obtain a manure containing the inorganic elements of grasses and turnips, and which is therefore preferable for manuring turnips. The excrement of pigeons contains the mineral elements of grain; that of rabbits, the elements of herbs and kitchen vegetables. The fluid and solid excrements of man, however, contain the mineral elements of grain and seeds in the greatest quantity.

## LETTER XV.

My dear sir: You are now acquainted with my opinions respecting the effects of the application of mineral agents to our cultivated fields, and also the rationale of the influence of the various kinds of manures; you will, therefore, now readily understand what I have further to say of the sources whence the carbon and nitrogen, indispensable to the growth of plants, are derived.

The growth of forests, and the produce of meadows, demonstrate that an inexhaustible quantity of carbon is furnished for vegetation by the carbonic acid of the atmosphere.

We obtain from an equal surface of forest, or meadow-land, where the necessary mineral elements of the soil are present in a suitable state, and to which no carbonaceous matter whatever is furnished in manures, an amount of carbon, in the shape of wood and hay, quite equal, and ofttimes more than is produced by our fields, in grain, roots,

and straw, upon which abundance of manure has been heaped.

It is perfectly obvious that the atmosphere must furnish to our cultivated fields as much carbonic acid, as it does to an equal surface of forest or meadow, and that the carbon of this carbonic acid is assimilated, or may be assimilated by the plants growing there, provided the conditions essential to its assimilation, and becoming a constituent element of vegetables, exist in the soil of these fields.

In many tropical countries the produce of the land in grain or roots, during the whole year, depends upon one rain in the spring. If this rain is deficient in quantity, or altogether wanting, the expectation of an abundant harvest is diminished or destroyed.

Now it can not be the water merely which produces this enlivening and fertilizing effect observed, and which lasts for weeks and months. The plant receives, by means of this water, at the time of its first development, the alkalies, alkaline earths, and phosphates, necessary to its organization. If these elements, which are necessary previous to its assimilation of atmospheric nourishment, be absent, its growth is retarded. In fact, the development of a plant is in a direct ratio to the amount of the matters it takes up from the soil. If, there-

fore, a soil is deficient in these mineral constituents, required by plants, they will not flourish even with an abundant supply of water.

The produce of carbon on a meadow, or an equal surface of forest land, is independent of a supply of carbonaceous manure, but it depends upon the presence of certain elements of the soil which in themselves contain no carbon, together with the existence of conditions under which their assimilation by plants can be effected. We increase the produce of our cultivated fields, in carbon, by a supply of lime, ashes, and marl, substances which can not furnish carbon to the plants, and yet it is indisputable,—being founded upon abundant experience,—that in these substances we furnish to the fields elements which greatly increase the bulk of their produce, and consequently the amount of carbon.

If we admit these facts to be established, we can no longer doubt that a deficient produce of carbon, or in other words the barrenness of a field does not depend upon carbonic acid, because we are able to increase the produce, to a certain degree, by a supply of substances which do not contain any carbon. The same source when the meadow and the forest are furnished with carbon, is also open to our cultivated plants. The great object of agriculture, therefore, is to dis-

cover the means best adapted to enable these plants to assimilate the carbon of the atmosphere which exists in it as carbonic acid. In furnishing plants, therefore, with mineral elements, we give them the power to appropriate carbon from a source which is inexhaustible; while in the absence of these elements the most abundant supply of carbonic acid, or of decaying vegetable matter would not increase the produce of a field.

With an adequate and equal supply of these essential mineral constituents in the soil, the amount of carbonic acid absorbed by a plant from the atmosphere in a given time is limited by the quantity which is brought into contact with its organs of absorption.

The withdrawal of carbonic acid from the atmosphere by the vegetable organism takes place chiefly through its leaves; this absorption requires the contact of the carbonic acid with their surface, or with the part of the plant by which it is absorbed.

The quantity of carbonic acid absorbed in a given time is in direct proportion to the surface of the leaves, and the amount of carbonic acid contained in the air; that is, two plants of the same kind, and the same extent of surface of absorption, in equal times and under equal conditions, absorb one and the same amount of carbon.

In an atmosphere containing a double proportion of carbonic acid, a plant absorbs, under the same condition, twice the quantity of carbon. Boussingault observed, that the leaves of the vine, enclosed in a vessel, withdrew all the carbonic acid from a current of air which was passed through it, however great its velocity. (Dumas Leçon, p. 23.) If, therefore, we supply double the quantity of carbonic acid to one plant, the extent of the surface of which is only half that of another living in ordinary atmospheric air, the former will obtain and appropriate as much carbon as the latter. Hence results the effects of humus, and all decaying organic substances, upon vegetation. If we suppose all the conditions for the absorption of carbonic acid present, a young plant will increase in mass, in a limited time, only in proportion to its absorbing surface; but if we create in the soil a new source of carbonic acid, by decaying vegetable substances, and the roots absorb in the same time three times as much carbonic acid from the soil as the leaves derive from the atmosphere, the plant will increase in weight fourfold. This fourfold increase extends to the leaves, buds, stalks, &c., and in the increased extent of surface, the plant acquires an increased power of absorbing nourishment from the air, which continues in action far beyond the time when its derivation of carbonic

acid through the roots ceases. Humus, as a source of carbonic acid in cultivated lands, is not only useful as a means of increasing the quantity of carbon—an effect which in most cases may be very indifferent for agricultural purposes—but the mass of the plant having increased rapidly in a short time, space is obtained for the assimilation of the elements of the soil necessary for the formation of new leaves and branches.

Water evaporates incessantly from the surface of the young plant; its quantity is in direct proportion to the temperature and the extent of the surface. The numerous radical fibrilliæ replace, like so many pumps, the evaporated water; and so long as the soil is moist, or penetrated with water, the indispensable elements of the soil, dissolved in the water, are supplied to the plant. The water absorbed by the plant evaporating in an aëriform state, leaves the saline and other mineral constituents within it. The relative proportion of these elements taken up by a plant, is greater the more extensive the surface and more abundant the supply of water; where these are limited, the plant soon reaches its full growth, while if their supply is continued, a greater amount of elements necessary to enable it to appropriate atmospheric nourishment being obtained, its development proceeds much further. The quantity, or

mass of seed produced, will correspond to the quantity of mineral constituents present in the plant. That plant, therefore, containing the most *alkaline phosphates* and *earthy salts*, will produce more or a greater weight of seeds than another which, in an equal time, has absorbed less of them. We consequently observe, in a hot summer, when a further supply of mineral ingredients from the soil ceases through want of water, that the height and strength of plants, as well as the development of their seeds, are in direct proportion to its absorption of the elementary parts of the soil in the preceding epochs of its growth.

The fertility of the year depends in general upon the temperature, and the moisture or dryness of the spring, if all the conditions necessary to the assimilation of the atmospheric nourishment be secured to our cultivated plants. The action of humus, then, as we have explained it above, is chiefly of value in gaining *time*. In agriculture, this must ever be taken into account; and in this respect *humus* is of importance in favoring the growth of vegetables, cabbages, &c.

But the ceralia, and plants grown for their roots, meet on our fields, in the remains of the preceding crop, with a quantity of decaying vegetable substances corresponding to their contents of mineral nutriment from the soil, and consequently with a

quantity of carbonic acid adequate to their accelerated development in the spring. A further supply of carbonic acid, therefore, would be quite useless, without a corresponding increase of mineral ingredients.

From a morgen of good meadow land, 2,500 pounds weight of hay, according to the best agriculturists, are obtained on an average. This amount is furnished without any supply of organic substances, without manure containing carbon or nitrogen. By irrigation, and the application of ashes or gypsum, double that amount will be grown. But assuming 2,500 pounds weight of hay to be the maximum, we may calculate the amount of carbon and nitrogen derived from the atmosphere by the plants of meadows.

According to elementary analysis, hay, dried at a tempature of 100° Reaumur, contains 45.8 per cent. of carbon, and 1.5 per cent. of nitrogen. 14 per cent. of water retained by the hay, dried at common temperatures, is driven off at 100°. 2500 pounds weight of hay, therefore, corresponds to 2150 pounds, dried at 100°. This shows us, that 984 pounds of carbon, and 32.2 pounds weight of nitrogen, have been obtained in the produce of one morgen of meadow-land. Supposing that this nitrogen has been absorbed by the plants in the form of ammonia, the atmo-

sphere contains 39.1 pounds weight of ammonia to every 3,640 pounds weight of carbonic acid (=984 carbon, or 27 per cent.); or, in other words, to every 1,000 pounds weight of carbonic acid, $10\frac{7}{10}$ pounds of ammonia, that is, to about $\frac{1}{100000}$ the weight of the air, or $\frac{1}{60000}$ of its volume.

For every 100 parts of carbonic acid absorbed by the surface of the leaves, the plant receives from the atmosphere somewhat more than one part of ammonia.

With every 1,000 pounds of carbon, we obtain—

| | | | |
|---|---|---|---|
| From a meadow . . | 32 7-10 | pounds | of nitrogen. |
| From cultivated fields— | | | |
| In wheat . . | 21.5 | " | " |
| Oats . . . | 22.3 | " | " |
| Rye . . . | 15.2 | " | " |
| Potatoes . . | 34.1 | " | " |
| Beetroot . . | 39.1 | " | " |
| Clover . . | 44 | " | " |
| Peas . . | 62 | " | " |

Boussingault obtained from his farm at Bechelbronn, in Alsace, in five years, in the shape of potatoes, wheat, clover, turnips, and oats, 8383 of carbon, and 250.7 nitrogen. In the following five years, as beetroot, wheat, clover, turnips, oats, and rye, 8,192 of carbon, and 284.2 of nitrogen. In a further course of six years, potatoes, wheat, clover, turnips, peas, and rye, 10,949 of carbon, 356.6

of nitrogen; in sixteen years, 27,424 carbon, 858.5 nitrogen: which gives, for every 1,000 carbon, 31.3 nitrogen.

From these interesting and unquestionable facts, we may deduce some conclusions of the highest importance in their application to agriculture.

1. We observe that the relative proportions of carbon and nitrogen, stand in a fixed relation to the surface of the leaves. Those plants in which all the nitrogen may be said to be concentrated in the seeds, as the ceralia, contain on the whole less nitrogen than the leguminous plants, peas and clover.

2. The produce of nitrogen on a meadow which receives no nitrogenized manure, is greater than that of a field of wheat which has been manured.

3. The produce of nitrogen in clover and peas, which agriculturists will acknowledge require no nitrogenized manure, is far greater than that of a potato or turnip field, which is abundantly supplied with such manures.

Lastly: and this is the most curious deduction to be derived from the above facts. If we plant potatoes, wheat, turnips, peas, and clover (plants containing potash, lime, and silex), upon the same land, three times manured, we gain in sixteen

years, for a given quantity of carbon, the same proportion of nitrogen which we receive from a meadow which has received no nitrogenized manure.

On a morgen of meadow land, we obtain in plants, containing silex, lime, and potash, 984 carbon, 32.2 nitrogen. On a morgen of cultivated land, in an average of sixteen years, in plants containing the same mineral elements, silex, lime, and potash, 857 carbon, 26.8 nitrogen.

If we add the carbon and nitrogen of the leaves of the beetroot, and the stalks and leaves of the potatoes, which have not been taken into account, it still remains evident that the cultivated fields, notwithstanding the supply of carbonaceous and nitrogenized manures, produced no more carbon and nitrogen than an equal surface of meadow land supplied only with mineral elements.

What, then, is the rationale of the effect of manure—of the solid and fluid excrements of animals?

This question can now be satisfactorily answered: that effect is the restoration of the elementary constituents of the soil which have been gradually drawn from it in the shape of grain and cattle. If the land I am speaking of had not been manured during those 16 years, not more than one half, or

perhaps than one third part of the carbon and nitrogen would have been produced. We owe it to the animal excrements, that it equalled in production the meadow-land, and this, because they restored the mineral ingredients of the soil removed by the crops. All that the supply of manure accomplished, was to prevent the land from becoming poorer in these, than the meadow which produces 2500 pounds of hay. We withdraw from the meadow in this hay as large an amount of mineral substances as we do in one harvest of grain, and we know that the fertility of the meadow is just as dependant upon the restoration of these ingredients to its soil, as the cultivated land is upon manures. Two meadows of equal surface, containing unequal quantities of inorganic elements of nourishment—other conditions being equal—are very unequally fertile; that which possesses most, furnishes most hay. If we do not restore to a meadow the withdrawn elements, its fertility decreases. But its fertility remains unimpaired, with a due supply of animal excrements, fluid and solid, and it not only remains the same, but may be increased by a supply of mineral substances alone, such as remain after the combustion of ligneous plants and other vegetables; namely, *ashes*. Ashes represent the whole nourishment which vegetables receive from the soil. By fur-

nishing them in sufficient quantities to our meadows, we give to the plants growing on them the power of condensing and absorbing carbon and nitrogen by their surface. May not the effec of the solid and fluid excrements, which are the ashes of plants and grains, which have undergone combustion in the bodies of animals and of man, be dependant upon the same cause? Should not the fertility, resulting from their application, be altogether independent of the ammonia they contain? Would not their effect be precisely the same in promoting the fertility of cultivated plants, if we had evaporated the urine, and dried and burned the solid excrements? Surely the cerelia and leguminous plants which we cultivate must derive their carbon and nitrogen from the same source whence the graminea and leguminous plants of the meadows obtain them! No doubt can be entertained of their capability to do so.

In Virginia, upon the lowest calculation, 22 lbs. weight of nitrogen were taken on the average, yearly, from every morgen of the wheat-fields. This would amount, in 100 years, to 2,200 lbs. weight. If this were derived from the soil, every morgen of it must have contained the equivalent of 110,000 lbs. weight of animal excrements (assuming the latter, when dried, at the temperature of boiling water, to contain 2 per cent.).

In Hungary, as I remarked in a former Letter, tobacco and wheat have been grown upon the same field for centuries, without any supply of nitrogenized manure. Is it possible that the nitrogen essential to, and entering into, the composition of these crops, could have been drawn from the soil?

Every year renews the foliage and fruits of our forests of beech, oak, and chestnuts; the leaves, the acorns, the chestnuts, are rich in nitrogen; so are cocoa-nuts, bread-fruit, and other tropical productions. This nitrogen is not supplied by man. Can it indeed be derived from any other source than the atmosphere?

In whatever *form* the nitrogen supplied to plants may be contained in the atmosphere, in whatever state it may be when absorbed, from the atmosphere it must have been derived. Did not the fields of Virginia receive their nitrogen from the same source as wild plants?

Is the supply of nitrogen in the excrements of animals quite a matter of indifference, or do we receive back from our fields a quantity of the elements of blood corresponding to this supply?

The researches of Boussingault have solved this problem in the most satisfactory manner. If, in his grand experiments, the manure which he gave to his fields was in the same state, that is, dried at

110° in a vacuum, as it was when analyzed, these fields received, in 16 years, 1300 pounds of nitrogen. But we know that by drying all the nitrogen escapes which is contained in solid animal excrements, as volatile carbonate of ammonia. In this calculation the nitrogen of the urine, which by decomposition is converted into carbonate of ammonia, has not been included. If we suppose it amounted to half as much as that in the dried excrements, this would make the quantity of nitrogen supplied to the fields 1950 pounds.

In 16 years, however, as we have seen, only 1517 pounds of nitrogen, was contained in their produce of grain, straw, roots, et cetera—that is, *far less* than was supplied in the manure; and in the same period the same extent of surface of good meadow-land (one hectare = a Hessian morgen), which received no nitrogen in manure, 2060 pounds of nitrogen.

It is well known that in Egypt, from the deficiency of wood, the excrement of animals is dried, and forms the principal fuel, and that the nitrogen from the soot of this excrement was, for many centuries, imported into Europe in the form of sal ammoniac, until a method of manufacturing this substance was discovered at the end of the last century by Gravenhorst of Brunswick. The fields in the Delta of the Nile are supplied with

no other animal manure than the ashes of the burnt excrements, and yet they have been proverbially fertile from a period earlier than the first dawn of history, and that fertility continues to the present day as admirable as it was in the earliest times. These fields receive, every year, from the inundation of the Nile, a new soil, in its mud deposited over their surface, rich in those mineral elements which have been withdrawn by the crops of the previous harvest. The mud of the Nile contains as little nitrogen, as the mud derived from the Alps of Switzerland, which fertilizes our fields after the inundations of the Rhine. If this fertilizing mud owed this property to nitrogenized matters; what enormous beds of animal and vegetable exuviæ and remains ought to exist in the mountains of Africa, in heights extending beyond the limits of perpetual snow, where no bird, no animal finds food, from the absence of all vegetation!

Abundant evidence in support of the important truth we are discussing, may be derived from other well-known facts. Thus, the trade of Holland in cheese may be adduced in proof and illustration thereof. We know that cheese is derived from the plants which serve as food for cows. The meadow-lands of Holland derive the nitrogen of cheese from the same source as with us; that is, the atmosphere. The milch cows of Holland

remain day and night on the grazing-grounds, and therefore, in their fluid and solid excrements return directly to the soil all the salts and earthy elements of their food: a very insignificant quantity only is exported in the cheese. The fertility of these meadows can, therefore, be as little impaired as our own fields, to which we restore all the elements of the soil, as manure, which have been withdrawn in the crops. The only difference is, in Holland they remain on the field, while we collect them at home and carry them, from time to time, to the fields.

The nitrogen of the fluid and solid excrements of cows, is derived from the meadow-plants, which receive it from the atmosphere; the nitrogen of the cheese also must be drawn from the same source. The meadows of Holland have, in the lapse of centuries, produced millions of hundredweights of cheese. Thousands of hundredweights are annually exported, and yet the productiveness of the meadows is in no way diminished, although they never receive more nitrogen than they originally contained.

Nothing then can be more certain than the fact, that an exportation of nitrogenized products does not exhaust the fertility of a country; inasmuch as it is not the soil, but the atmosphere, which furnishes its vegetation with nitrogen. It follows

consequently, that we can not increase the fertility of our fields by a supply of nitrogenized manure, or by salts of ammonia, but rather that their produce increases or diminishes in a direct ratio with the supply of mineral elements capable of assimilation. The formation of the constituent elements of blood—that is, of the nitrogenized principles in our cultivated plants—depends upon the presence of inorganic matters in the soil, without which no nitrogen can be assimilated, even when there is a most abundant supply. The ammonia contained in animal excrements exercises a favorable effect, inasmuch as it is accompanied by the other substances necessary to accomplish its transition into the elements of blood. If we supply ammonia associated with all the conditions necessary to its assimilation, it ministers to the nourishment of the plants; but if this artificial supply is not given, they can derive all the needed nitrogen from the atmosphere—a source, every loss from which is restored by the decomposition of the bodies of dead animals and the decay of plants. Ammonia certainly favors and accelerates the growth of plants in all soils, wherein all the conditions of its assimilation are united; but it is altogether without effect, as respects the production of the elements of blood where any of these conditions are wanting. We can suppose that *asparagin*, the ac

tive constituent of *asparagus*, the mucilaginous root of the *marsh-mallow*, the nitrogenized and sulphurous ingredients of *mustard-seed*, and of all cruciferous plants, may originate without the aid of the mineral elements of the soil. But if the principles of those vegetables, which serve as food, could be generated without the co-operation of the mineral elements of blood, without potash, soda, phosphate of soda, phosphate of lime, they would be useless to us and to herbivorous animals as food; they would not fulfil the purpose for which the wisdom of the Creator has destined them. In the absence of alkalies and the phosphates, no blood, no milk, no muscular fibre, can be formed. Without phosphate of lime, our horses, sheep, and cattle, would be without bones.

In the urine and in the solid excrements of animals we carry ammonia, and consequently nitrogen, to our cultivated plants, and this nitrogen is accompanied by all the mineral elements of food exactly in the same proportions in which both are contained in the plants which served as food to the animals, or, what is the same, in those proportions in which both can serve as nourishment to a new generation of plants, to which both are essential.

The effect of an artificial supply of ammonia, as a source of nitrogen, is, therefore, precisely analo-

gous to that of humus as a source of carbonic acid—it is limited to a *gain of time;* that is, it accelerates the development of plants. This is of great importance, and should always be taken into account in gardening, especially in the treatment of the kitchen-garden; and as much as possible in agriculture on a large scale, where the time occupied in the growth of the plants cultivated is of importance.

When we have exactly ascertained the quantity of ashes left after the combustion of cultivated plants which have grown upon all varieties of soil, and have obtained correct analyses of these ashes, we shall learn with certainty which of the constituent elements of the plants are constant and which are changeable, and we shall arrive at an exact knowledge of the sum of all the ingredients we withdraw from the soil in the different crops.

With this knowledge the farmer will be able to keep an exact record of the produce of his fields in harvest, like the account-book of a well-regulated manufactory; and then by a simple calculation he can determine precisely the substances he must supply to each field, and the quantity of these, in order to restore their fertility. He will be able to express, in pounds weight, how much of this or that element he must give to the soil in order to augment its fertility for any given kind of plants.

These researches and experiments are the great *desideratum* of the present time. To the united efforts of the chemists of all countries we may confidently look for a solution of these great questions, and by the aid of enlightened agriculturists we shall arrive at a rational system of gardening, horticulture, and agriculture, applicable to every country and all kinds of soil, and which will be based upon the immutable foundation of observed facts and philosophical induction.

## LETTER XVI.

My dear sir : My recent researches into the constituent ingredients of our cultivated fields have led me to the conclusion that, of all the elements furnished to plants by the soil and ministering to their nourishment, the phosphate of lime, or, rather, the phosphates generally, must be regarded as the most important.

In order to furnish you with a clear idea of the importance of the phosphates, it may be sufficient to remind you of the fact, that the blood of man and animals, beside common salt, always contains alkaline and earthy phosphates. If we burn blood and examine the ashes which remain, we find certain parts of them soluble in water, and others insoluble. The soluble parts are, common salt and alkaline phosphates ; the insoluble consist of phosphate of lime, phosphate of magnesia, and oxide of iron.

These mineral ingredients of the blood—with-

out the presence of which in the food the formation of blood is impossible—both man and animans derive, either immediately or mediately, through other animals, from vegetable substances used as food; they had been constituents of vegetables, they had been parts of the soil upon which the vegetable substances were developed.

If we compare the amount of the phosphates in different vegetable substances with each other, we discover a great variety, while there is scarcely any ashes of plants altogether devoid of them, and those parts of plants which experience has taught us are the most nutritious, contain the largest proportion. To these belong all seeds and grain, especially the varieties of bread-corn, peas, beans, and lentils.

It is a most curious fact that, if we incinerate grain or its flour, peas, beans, and lentils, we obtain ashes, which are distinguished from the ashes of all other parts of vegetables by the absence of *alkaline carbonates* The ashes of these seeds, when recently prepared, do not effervesce with acids; their soluble ingredients consist solely of alkaline phosphates, the insoluble parts of phosphate of lime, phosphate of magnesia, and oxide of iron; consequently, of the very same salts which are contained in blood, and which are ab-

solutely indispensable to its formation. We are thus brought to the further indisputable conclusion that no seed suitable to become food for man and animals can be formed in any plant without the presence and co-operation of the phosphates. A field in which phosphate of lime, or the alkaline phosphates form no part of the soil, is totally incapable of producing grain, peas, or beans.

An enormous quantity of these substances indispensable to the nourishment of plants, is annually withdrawn from the soil and carried into great towns, in the shape of flour, cattle, et cetera. It is certain that this incessant removal of the phosphates must tend to exhaust the land and diminish its capability of producing grain. The fields of Great Britain are in a state of progressive exhaustion from this cause, as is proved by the rapid extension of the cultivation of turnips and mangel-wurzel—plants which contain the least amount of the phosphates, and therefore require the smallest quantity for their development. These roots contain 80° to 92° per cent. of water. Their great bulk makes the amount of produce fallacious, as respects their adaptation to the food of animals, inasmuch as their contents of the ingredients of the blood—that is, of substances which can be transformed into flesh—stands

in a direct ratio to their amount of phosphates, without which neither blood nor flesh can be formed.

Our fields will become more and more deficient in these essential ingredients of food, in all localities where custom and habits do not admit the collection of the fluid and solid excrements of man, and their application to the purposes of agriculture. In a former letter I showed you how great a waste of phosphates is unavoidable in England, and referred to the well-known fact that the importation of bones restored in a most admirable manner the fertility of the fields exhausted from this cause. In the year 1827 the importation of bones for manure amounted to forty thousand tons, and Huskisson estimated their value to be from one hundred thousand to two hundred thousand pounds sterling. The importation is still greater at present, but it is far from being sufficient to supply the waste.

Another proof of the efficacy of the phosphates in restoring fertility to exhausted land is afforded by the use of the *guano*—a manure which, although of recent introduction into England, has found such general and extensive application.

We believe that the importation of one hundred weight of *guano* is equivalent to the importation

of eight hundred weight of wheat—the hundred weight of guano assumes, in a time which can be accurately estimated, the form of a quantity of food corresponding to eight hundred weight of wheat. The same estimate is applicable in the valuation of bones.

If it were possible to restore to the soil of England and Scotland the phosphates which during the last fifty years have been carried to the sea by the Thames and the Clyde, it would be equivalent to manuring with millions of hundred weights of bones, and the produce of the land would increase one third, or perhaps double itself, in five to ten years.

We can not doubt that the same result would follow, if the price of the guano admitted the application of a quantity to the surface of the fields, containing as much of the phosphates as have been withdrawn from them in the same period.

If a rich and cheap source of phosphate of lime and the alkaline phosphates were open to England, there can be no question that the importation of foreign corn might be altogether dispensed with after a short time. For these materials England is at present dependant upon foreign countries, and the high price of guano and of bones prevents their general application, and in sufficient quan-

tity. Every year the trade in these substances must decrease, or their price will rise as the demand for them increases.

According to these premises, it can not be disputed that the annual expense of Great Britain for the importation of bones and guano is equivalent to a duty on corn—with this difference only, that the amount is paid to foreigners in money.

To restore the disturbed equilibrium of constitution of the soil—to fertilize her fields—England requires an enormous supply of animal excrements; and it must therefore excite considerable interest to learn that she possesses, beneath her soil, beds of fossil *guano*, strata of animal excrements, in a state which will probably allow of their being employed as a manure at a very small expense.

The coprolithes discovered by Dr. Buckland (a discovery of the highest interest to Geology), are these excrements; and it seems extremely probable that in these strata England possesses the means of supplying the place of recent bones, and therefore the principal conditions of improving agriculture—of restoring and exalting the fertility of her fields.

In the autumn of 1842, Dr. Buckland pointed out to me a bed of coprolithes in the neighborhood of Clifton, from half to one foot thick, enclosed in

a limestone formation, extending as a brown stripe in the rocks, for miles along the banks of the Severn. The limestone marl of Lyme Regis consists, for the most part, of one fourth part of fossil excrements and bones. The same are abundant in the lias of Bath, Eastern, and Broadway Hill, near Eversham. Dr. Buckland mentions beds, several miles in extent, the substance of which consists, in many places, of a fourth part of coprolithes.

Pieces of the limestone rock of Clifton, near Bristol, which is rich in coprolithes and organic remains, fragments of bones, teeth, &c., were subjected to analysis, and were found to contain above 18 per cent. of phosphate of lime. If this limestone is burned, and brought in that state to the fields, it must be a perfect substitute for bones, the efficacy of which as a manure does not depend, as has been generally but erroneously supposed, upon the nitrogenized matter which they contain, but on their phosphate of lime.

The osseous breccia found in many parts of England deserves especial attention, as it is highly probable that in a short time it will become an important article of commerce.

What a curious and interesting subject for contemplation! In the remains of an extinct *animal* world, England is to find the means of increasing

her wealth in agricultural produce, as she has already found the great support of her manufacturing industry in fossil fuel—the preserved matter of primeval forests—the remains of a *vegetable* world. May this expectation be realized! and may her excellent population be thus redeemed from poverty and misery

# DOG AND GUN;

## A Few Loose Chapters on Shooting.

AMONG WHICH WILL BE FOUND

## SOME ANECDOTES AND INCIDENTS.

BY JOHNSON J. HOOPER,

OF MONTGOMERY, ALA.

"And I promise you *shootinge*, by my judgment, is the most honeste pastime of all, and suche one, I am sure, of all other, that hindereth learninge litel or nothinge at all, whatsoever you and some other saye."—ASCHAM—*Old English Writer.*

See how the well-taught pointer leads the way;
The scent grows warm; he stops; he springs the prey;
The fluttering covey from the stubble rise,
And on swift wing divide the sounding skies!"

[GAY—*Rural Sports.*

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# DEDICATION.

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## TO HENRY WILLIAM HERBERT, ESQ.,

"THE CEDARS," NEW JERSEY.

DEAR SIR: Knowing you only through your works, I take the liberty of inscribing to you these "*Loose Chapters*," on a subject which your own pen has so fully adorned, conscious that the chief merit in them is to be found in those portions which you, and other "shooting" friends, have contributed to them. If this little book incites the young Sportsman to read your own unequalled "*Field Sports*," it will have accomplished its main purpose.

Respectfully,

Your obedient Servant,

THE AUTHOR.

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# DOG AND GUN.

## CHAPTER I.

### THE GENTLEMAN'S AMUSEMENT.

My young sporting friends will observe, that in my title I fortify my own opinion of the manliness and innocence of Field Sports with a classic authority, while the quotation from the bard, shows our theme not wanting in poetic dignity. In my day I have heard the delightful pastime much reviled by prejudiced ignorance and under-bred and over-done morality; but while the advocate of Dog and Gun is backed by old *Ascham*, and a host of such ancient worthies, and finds among the writers of the present day such aid as is afforded by the graphic and versatile pen of Herbert, he may well afford to treat all cavillers, high or low, with a quiet curl of his lip. I need only add, that the shooting of game birds, over pointers and setters, has been, time out of mind, *the gen'leman's* amusement; so much so, that I would hardly hesitate to make some guess concerning any man's antecedents, who should cross a stubble with me one of these crispy, brown October mornings.

Getting towards the main topic as speedily as possible, I will remark in a general way that, in this region, game proper may be considered as limited to the Quail and two or three varieties of Duck. Both Woodcock and Snipe,

though increasing latterly, have been too sparsely scattered through Eastern Alabama, to be worthy of particular attention. Here and there, there are some few grounds, in the neighborhood of large streams, where a day's sport may be had, at the proper season, shooting the latter. It is likely, however, judging by the past, that in a few years both will afford fine amusement to the Alabama sportsman.* At present, I suspect that my friends, Col. Augustus Brooks and A. R. Meslier, Esq., bag more snipe and cock, in the immediate neighborhood of Mobile, than are killed in all the rest of the State put together. If, in this idea, I am mistaken, I shall be very much obliged to any friend who can furnish me an authoritative correction. Indeed, in all that I write on the subject of sporting, I would have it remembered I bring a very limited experience to bear; and I fulfil a promise made, some time ago, to several young friends, as much to direct their attention to the works of *Frank Forester* (Herbert), *Hawker* (Am. Ed. by W. T. Porter, Esq.), "*Dinks*," and others, as to convey a few grains of information suitable to this latitude, and not perhaps to be readily picked up in sporting books.

It may be added, that whoso takes the *Spirit of the Times* will find that, from week to week, during the appropriate seasons, Mr. Porter's correspondents furnish abund-

* Since the foregoing paragraph first appeared in print, I have been informed by my friend, H. C. S., Esq., of Montgomery, that as fine snipe-shooting as the world affords may be had, in the proper season, in the prairies south of Montgomery. In "the bend" of the Alabama, opposite the city, also, I am informed, that a bag of fifty may sometimes be secured by a good shot. Perhaps before I have done with the series, some friend will furnish a "full, true and particular" account of the best localities for the bird, and the mode of shooting them. As I understand it now, dogs are not used. While on the subject of *snipe*, I may remark that the writer flushed and shot a solitary bird, on the 23d Dec. ult., on the edge of a duck-pond, not very far from Montgomery. He was an excellent case.

ance of facts, feats, and general information in the sporting line, a great deal of which is really valuable, as throwing light on the history and habits of the game of the country.

To return from a digression: The *Quail* is our chief, most reliable game bird in this section. A brave fellow he is too, and worthy to be properly known and called by his own true name, and not by his universal misnomer, *Partridge*. Let all true sportsmen call him aright—leaving it to the pot-hunter who shoots the bevy as it huddles on the ground, or murders the whistling cock on the fence or stump, and the clown who nets or traps what he cannot fairly kill, to apply to him a name for which there is no owner on this continent. Every one who writes on sports of the field has his rules; and *my* RULE THE FIRST is—*Call Quail*, QUAIL! Persistently give him his true name, and you are, young reader, one step nearer sportsmanship than the *commune vulgus* who kill him foully and serve him *more* foully, to wit: in hog's lard. Presently I shall tell you what I know of the habits of the bird, and when you have added your own observation thereunto, you will quite probably attain to killing him in good style, and to knowing how to have him dressed with a half-teaspoonful of pale brandy, permeated through his plump breast, according to the recipe of my friend, Dr. E. B. J., of Macon.

Of the ducks that visit us here (except the *Canvas-back*, and some other varieties in Mobile Bay, about which I know nothing, but of which I should like to receive information from those who do), incomparably the finest is that old stand-by, the *Mallard*. Shot, or only *to be* shot, he is *the* duck of our waters; whereby, I mean that the sport he affords, on the river or the table, is superior to that we derive from any of the genus *Anas*. Next to him, the *Blue-winged Teal* is considered generally to rank. Then comes the Wood or Summer Duck, known generally in the country as the *Striped-head*. There are

a few other species, less common, that I may refer to hereafter.

I have mentioned now the different varieties of game about which, as it respects their habits and the modes of killing, I propose to write, in these discursive essays. As I go along, I hope to get aid from more experienced persons; and I especially ask it from those who have signified a willingness to contribute to the *Mail** on the subject of *Sporting*.

It will be well enough to close this chapter with some remarks on

### SPORTING TERMS.

It may be here observed, that there is more than appears, at first blush, in uniformity of sporting nomenclature. Without looking at all to the fact, that the sportsman's associations leak out by the terms of art which he uses, just as the ill-bred fellow is detected by the ordinary dialect he affects, it is desirable that persons pursuing field-sports, in any given section of country, should adopt the same phraseology, for reasons growing out of the *positive inconvenience* of want of uniformity. To illustrate: A has been accustomed all his life to the use of the proper word, *toho!* to bring his dog to a stand. He can no more —in ninety instances out of the hundred—bring himself to substitute the word *heed!* when a-field, than he can fly. But he gets a dog broken by some ignorant trainer, which has been taught to obey this slang word of command; and by the end of the week, he has *Dash* thoroughly confused between *toho!* and *heed!*—and himself just about as much so. Or, B lends a young dog (broken to the slang word), to a friend, because he knows that friend is an accomplished sportsman, for a day's shooting. The

* A newspaper published at Montgomary, Ala., by the author.

friend discovers that *Plato* is rather eagerly pressing a running bevy, and with regulated, steady voice, not loud, gives the order, *toho! Plato* is probably expecting the word he was taught, and hearing it not, but another in its stead, springs in and flushes—and, possibly, runs a quarter of a mile before he can be brought in. The friend trounces him severely, the dog the while only vaguely conscious of a fault—for his mind is not carried back to the disobeying of a command he was previously taught to obey. There you have it: the shooter curses the dog for an ill-taught mongrel (when he is, perhaps, a capital young pointer, only a trifle heady), and sets him back in his education, by allowing him to flush and by the whipping, fully half a season. To illustrate again: you might as well break *horses* as *dogs* to diverse words of command. Add to all this, the convenience to those who interchange opinions, theories, experiences, on the subject of shooting, through the press, or conversationally, and I think the argument becomes irresistible in favor of *a Uniform Sporting Nomenclature.*

Mr. Herbert's work on Field Sports is the standard in this country, on this and cognate subjects. I quote from it, as many of the technical terms of the art as are necessary for the range I propose to cover:

| | |
|---|---|
| QUAIL, a single hatching . . . . | A BEVY. |
| SNIPE, " " . . . . | A BROOD. |
| WOODCOCK, " " . . . . | A BROOD. |
| QUAIL, several hatchings together . | A PACK. |
| QUAIL, less than grown, are . . . | SQUEAKERS. |
| SNIPE, flocking together, are . . | A WHISP. |
| WILD DUCK, a large flock, is . . . | A TEAM. |
| WILD DUCK, a small flock, is . . | A PLUMP. |
| TEAL, a number is . . . . . | A FLOCK. |
| TWO QUAIL, make . . . . | A BRACE. |
| " WOODCOCK, " SNIPE, or " DUCKS, make . . . | A COUPLE. |

| | |
|---|---|
| Two Pointers or Setters, are . | A Brace. |
| Three " " . . . | A Leash. |
| To make a Bird Dog stand . . . | Toho! |
| " " drop to shot . . | Charge! |
| " " come behind . | Heel! |
| " " move cautiously | Steady! |
| " " rise from the charge | Hold Up! |
| " " hunt for dead bird . | Seek Dead! |
| " " bring in dead after pointing it . . | Fetch! |

Having given thus much from Herbert's *Sporting Nomenclature*, I may add that a dog is said to *quarter his ground*, NOT "to hunt about the field;" he *breaks his charge*, and does *not* "jump up and run after the birds." He *retrieves* game when he brings it in. He *flushes the bevy* (if he is ill-behaved,) and does not "scare up the flock." The single bird sometimes *towers*, (*i. e.* flies very high and almost perpendicularly), if shot through the brain or heart. The bevy generally *flies to covert* when disturbed, but the sportsman *marks them down*. If he is a good shot, he *bags* quite a number.

My young readers will remember my *Rule the First: Call Quail*, Quail!

And here I will add another almost as short. It is founded on the fact that there is no such thing as a *Partridge*, on the whole broad continent—a fact that taboos to the American sportsman the word *covey*. I know that far better sportsmen than I am, habitually use it; but it is a custom we should "reform altogether." My *Rule the Second*, then, is: *Call a Bevy of Quail*, A Bevy of Quail!

## CHAPTER II.

### HOW TO CHOOSE A GOOD GUN.

THE prime necessity of a young sportsman, is, of course, a GOOD GUN. If he has plenty of money, there need be little difficulty in supplying himself, quite speedily, with an excellent article. He has but to get a friend, or some reliable business man, not in the trade of selling guns, to import him one from the workshop of Westley Richards, or Purday, or Moore, or some other crack English maker, and the thing is done. Such a gun, reliable and perfectly well-finished, will cost from $300 to $500. Frank Forester tells us that guns, a good deal resembling this fine English work (and really being of English manufacture), put up in very nice mahogany cases, with velvet lining, may be bought for from $75 to $150. Hundreds of these guns are sold annually, in hardware and other stores. They are called by Forester *Brumagem* ware, taking the name from a corruption of *Birmingham* (England), where a vast deal of such showy but unreliable stuff is fabricated. By the way, Richards is the only Birmingham maker of any repute, and it is said of him, in these latter days, that his barrels are too soft. At any rate, his reputation is on the decline. Manton (the successor, of course, of old Joe Manton), is a fourth rate maker. There are a dozen or more, however, who are said to make as good guns as "old Joe" ever did, and there is no difficulty in getting the article, provided you are able and willing to pay for it; but the best informed think it bad policy to import a gun which costs under

$300. Even that is rather low. If unable to stand these figures, the better plan, according to Herbert, is to get Constable, of Philadelphia, or John Mullin, of 16 Ann street, New York, to build you one. Of the former, I know nothing, except by reputation; but of Mr. Mullin I can speak, after trying his work, with the utmost confidence. He built me a gun, a little more than a year ago, at the instance of my friend, Mr. Porter, of the *Spirit of the Times*, which comes up fully to all he engaged it should do. I believe that his *forte* is the making of the heavier descriptions of barrels, especially for bay and river duck-shooting. His work is perfectly neat, and while, of course, it wants the extreme finish of the costly English gun, is to the full as honest a shooter. And if for $150 (with $10 to $20 for cover, case, and small appliances), you get a piece with all the substantial qualities of *hard, close shooting, regularity in dispersion of shot*, and *durability of barrels and locks*, which you would obtain in an English gun for $300 or $400, the gain is greatly yours. These qualities I and some friends of mine have obtained, within these last two or three years, from Mr. Mullin, at the mentioned price. The guns he has sent to Georgia and Alabama, so far as I can ascertain, after a good deal of inquiry, have in no instance failed to prove themselves the very hardest and closest shooters.

While on the subject of Mullin's work, I will state that his best barrels are *laminated steel*. Somehow or other, I had imbibed a strong prejudice against them, notwithstanding one of the very best guns I ever shot was one of them, made by Stevens, which I have parted with because it *was* of laminated steel. It was a little difficult for Mr. Mullin to convert me from this prejudice, but he did finally succeed. In a letter to me, he says: "I give you a description of the laminated steel barrels, which *you seem so much to fear*. They are made of thin layers

of steel, twisted as a rope of three strands, and then twisted around a rod to form the barrel; then welded and then put through the annealing process, which takes all, or nearly all, of the *carbon* out, and leaves the barrels all the *closeness* of steel, and all the *toughness* of fine iron. Suppose all the carbon is taken out of your razor, and it rendered iron once more, then what iron can compare with it in closeness and toughness?" Again, in another letter, he sends me a *table of the comparative capacity of resistance* of different barrels, and says: "I hope the scale opposite will satisfy your fears, and when you come to use the gun, I feel certain no man could prevail on you to go back to iron barrels; the steel *kill* so clean and *keep* so clean, and no give-out in their shooting powers." Again he says: "They (the steel barrels) will not *lead* on account of their closeness, nor *breech-burn*, but maintain their power of shooting," &c.

The following is the table of comparative strength of the different materials used in gun building, furnished me a year or two since by Mr. Mullin:

| | | PRESSURE OF THE CHARGE. | SURPLUS STRENGTH. |
|---|---|---|---|
| Laminated Steel is equal to a pressure of . . | 6,022 lbs. | 1,700 lbs. | 4,322 lbs. |
| Stubb Twist . . . . | 4,818 " | " | 3,118 " |
| Charcoal Iron . . . . | 4,526 " | " | 2,826 " |
| Three-penny Skelp Iron | 3,841 " | " | 2,141 " |
| Damascus Iron . . . . | 3,292 " | " | 1,592 " |
| Two-penny Skelp Iron . | 2,840 " | " | 1,140 " |

Assuming the correctness of this comparison, and I know nothing to throw any doubt upon it, the laminated steel ought to drive other descriptions of barrels out of the market entirely. The "two-penny skelp" guns, I presume, are those which we see sold every day, in the stores, painted outside in rings like a raccoon's tail, and which are familiarly known as pot-metal. How any man of sense should risk his life forty times a day with such a

weapon, I cannot comprehend; but I presume a great many who have brains do not so jeopard them.

In determining as to the size of a gun, reference is of course to be had to the character of the shooting it is intended for Practically, in the South, almost every man limits himself to a single gun "of all work." He wants one convenient and tolerably effective in a deer, turkey, or duck hunt, and not too heavy for a day's fagging after quail or snipe. All writers and persons of any experience, agree that the dimensions of a gun for these various purposes, are as follows :—

| | |
|---|---|
| Length of barrels, . . | 32 inches. |
| Gauge, . . . . | No. 14. |
| Weight, . . . | 6½ to 7½ lbs. |

I believe that, from some cause, or other, more *good* guns are made of these measurements than of any other. It may be that the makers have so many to supply, that practice and experience in the particular size have gradually taught the exact relations of all the parts.

For the larger game mentioned above, it is better to have 32 to 34 inches, 10, 11, or 12 gauge, and 8 to 9 lbs. weight. But most men overweight themselves. A gun should be fully within the strength of the person who is to handle it. A strong man, *cæteris paribus*, shoots always better than a feeble one; the weak should shoot as light guns as are effective. To be sure, I do not practice what I preach-shooting an eight and a half pound gun, when six pounds would better suit my muscles—but then all small men are ambitious!

The custom of using long, small-gauged guns—for instance (and nothing is more common), barrels 34 to 36 inches, and 15 to 18 guage—is ridiculous. No man but a pot-hunter, ignorant and irreclaimable, would do so. Not

but that many of these guns do shoot excellently, but they do so not on account of their great length. In my opinion, a 14 gauge gun of 32 inches will carry as far as the same gauge with a half dozen inches added. If you increase the calibre, length may properly be added; but for any shoulder gun, I have no doubt 34 inches is quite enough, though possibly two inches more may benefit.

In purchasing guns in New York, or importing them to that city, I would recommend any friend of mine to engage the services of no one, out of the trade, but Wm. T. Porter, Esq., of the *Spirit of the Times*. If he has one *made* there, let him by all means go to Mullin, whom I recommend simply and solely, because I have dealt with him, paid him his best prices and got just what I wanted on all occasions.

Having got a gun, we naturally proceed to charge it. The chief difficulty is to obtain clean, strong powder. I know of but one powder answering this description*—that of Curtis & Harvey, English manufacturers. Their diamond grain is all that powder can be, or ought to be; their large grain, ducking powder, does not answer so well for *our* river and pond duck shooting. My attention was first attracted to the Diamond Grain by Forester's work, and I have never since willingly used any other. It is rather stronger than Du Pont's, and a pound will hardly foul a gun so much as a half dozen loads of the latter, which, like all American powder, is ineffably filthy. Curtis & Harvey's powder can generally be obtained of Messrs. W. B. & A. R. Bell, Dry Goods Dealers, Montgomery, and of Aubrey & Co., Produce Merchants, Mobile. These firms

* Since the above was written, I have become satisfied that the "*Electric Powder*," of the *Hazard Company*, is almost as clean as the "Diamond Grain." It is *the best* American Powder. Parker, Morris & Co., of Mobile, are the Agents for Alabama.

import it, principally as an accommodation to their sporting friends, and sell it at $1 25—low enough, all things considered.

For caps, Starkey has the best reputation, but his are excessively dear. Eley's double water proof, at $3 a thousand, are good enough for anybody. Richards' are said to be good. I know no others that are.

As for cartridges, Eley's are the only ones. They are excellent for a careful, good shot, and increase the effective range of a gun from 20 to 40 yards. But careless or inexpert hands will find no advantage in them; the reason is at moderate distances they require an exactitude of aim very nearly the same as in rifle shooting. I shall say more of them hereafter.

# CHAPTER III.

## ON THE CHARGING OF A GUN.

It may seem almost a waste of time, ink and paper, to discourse at any considerable length, of so simple a matter as the *charging of a gun*. And yet, I feel certain, that ignorance on this subject is more general than on almost any other branch of sporting. The number of men who load properly, is exceedingly small in proportion to the number who shoot. There are errors very common, both as to the proportions of powder and shot, and as to the comparative effect of light and heavy charges.

Pot-hunters invariably load by far too heavily. Observe boys who hunt squirrels and birds about the outskirts of the town, and you will soon see that any one of them will consume, in an afternoon, about as much ammunition as would serve a sportsman for a whole day's continuous shooting. The vulgar idea is, that a shot-gun is effective in proportion to the amount of powder and lead crammed down it, and many do therefore procure very large guns because they will bear larger crammings—and that without much reference to the particular service in which the piece is to be employed. All popular fallacies have *some slight* foundation in fact; but that reasoning which says, that if one and a quarter drachms powder and one ounce shot will, with a particular gun, kill quail at forty yards, *double the quantity* of each will kill the same bird at eighty yards, is utterly defective.

There is hardly a better test of sportsmanship than a man's mode of loading his gun. It is true that one *may*

load well and shoot badly, but practically it will be found to be very rarely the case. The doing of this thing well implies the powers of observation which go far towards making a passably good shot. Possibly a deficiency of a physical nature, such as want of muscle or unsteadiness of nerve, may unfortunately belong to the individual who charges his gun in the very best manner; but then he knows how the shooting ought to be done.

As I have said already, most guns are overloaded. There is usually about as great a quantity of powder burned in shooting squirrels, at twenty to forty yards, as it would be proper to expend in shooting deer, or even bear, at long ranges. It is really a wonder that more of the pot-metal barrels do not burst under the treatment they receive, in this respect. Their owners pack them with a liberality which can only be the result of absolute ignorance of the powers of the agencies they invoke. A half-handful of powder and a handful of shot is about the common charge, without any consideration as to distance, size of shot, kind of game, or capacity of the gun.

The little experience I have had, leads me to the belief, that even with good sportsmen, the error is almost invariably *overcharging*. In shooting quail, particularly, very small loads are sufficient. One of the most successful of my friends shoots a little less than a drachm of powder to about three-quarter ounce of number-seven shot. With this charge he is quite as certain at long shots, as any one of my acquaintance. I think, however, that he is a little under the mark as to quantity of powder, and uses shot a number too large. For quail shooting, the true proportions, in my opinion, are :

Powder ("Diamond Grain,") one and a half drachm.

Shot, number eight, one ounce.

This I would give only as an approximation to the true

proportions for the thirty-two inch fourteen-gauge gun; because the peculiar shooting of the particular gun may make some slight change necessary. For instance, a very strong shooter will not need more than a drachm to make the ounce of shot thoroughly effective at any ordinary range. Again, though number eight, "day in and day out," is—as Forester stoutly maintains—*the* shot for quail, yet I have known guns which killed them cleverly with sevens which *did not* do so with eights.

The reason for which eights are preferred is that the number of pellets to the ounce is much larger than of sevens. The difference between these two numbers is greater than between any other two numbers of shot. Forester estimates that a number-eight shot bears the samo relation, in size, to a quail, that a grape shot does to a man of ordinary frame. Allowing, then, largely for superior tenacity of life, on the part of the bird, the smaller shot is amply large for his execution, *if driven through him*, as it always will be, if the gun is of the right kind and properly charged.

For snipe shooting, I suppose that there need be no variation from the above, except as to the size of shot. Most persons use *nines*, I believe, in this kind of shooting. My experience does not entitle me to an opinion, but if I ever have opportunity to try the sport, I shall experiment with a number smaller—number ten.

Perhaps the widest variances, in so far as shot are concerned, occur among those who shoot ducks. Those who depend mainly on killing them on the water, from behind a stump or log, invariably use large shot—from threes up to B. Those who do not go a-pot hunting use fours and fives, and some as low as sixes. The last mentioned is, however, quite *small enough* for the *Mallard*, which is remarkably strong both of bone and feather. They will not only carry off, at times, a good many pellets, but their

strong plumage is excellently defensive against shot. Coming breast on in a right line, it is commonly believed that the thick cushion of feathers on the body will cause small shot to deflect. But I am inclined to think that a difference of one or even two numbers would not change the effect, in this respect.

Forester recommends number four for the Mallard, and I would sooner stand on his than any other single experience. For such guns as are most commonly used in the sport, the correct charge would be about

One and three-quarter drachms powder.

One and a quarter ounce shot.

These are less than the quantities spoken of in the Sporting Books, in connection with the subject of Duck Shooting; but it must be borne in mind that I always speak, in these papers, with reference to guns of a maximum weight of nine pounds.

For *Turkey Shooting*, the most successful hunters I know, recommend B or BB shot. The old-fashioned idea of large buckshot is going out of vogue. The turkey has immense vitality, and it really makes little difference with what size of shot you blow a hole through his body, if you leave his back, wings and legs unbroken: he will be very apt to take himself off, out of your reach, to die. *For riddling the head and neck* (which can be done at forty to fifty yards with any good gun), the chances are very greatly multiplied by the use of B or BB shot; and either of these sizes will very effectually break a wing or disable the back. As a general thing, in all sorts of shooting, the most common mistake is to use too large pellets; but the disadvantages of doing so are hardly as manifest in any other description of hunting, as in turkey shooting.

I have no doubt but that Eley's Wire Cartridge answers a better purpose for killing the turkey, than for any other game. The sport generally gives ample time for

careful shooting, and the great force of the cartridge and its regular dispersion of shot, enable the hunter to count with great certainty on perforating the neck or head, at fifty or even sixty yards. But in shooting cartridges, there is a rule to be remembered which does not hold, at all in the shooting of loose shot. With the latter, the less the powder used, the closer your shot go. With the cartridge, the greater the charge of powder, *the greater the velocity* of the cartridge, and, consequently, the less the time allowed, in a given distance, for the expulsion of the shot from the wire cage, and the consequent scattering. You must therefore increase your powder (up to a certain limit, of course), to increase the velocity of the cage and its contents. If I were going to shoot turkeys, I would use two drachms of moderately coarse-grained powder to an ounce and a half of B shot. Or two and a half drachms powder to a BB cartridge.

This suggests to my mind the chief objection I have to Eley's cartridge. The BB cartridge, gauge 11, weighs two ounces; *i. e.* one and a half ounce shot, and half ounce bone dust (in alternate layers with the shot), wire cage, cork, and paper. These two ounces are in a very dense, compact form; it is almost equivalent to shooting the same quantity of bar lead. The weight requires at least two and a half drachms strong powder to keep it well in line for fifty-five or sixty yards. If it was made to weigh half an ounce less, its range would, I think, be considerably increased by the use of the same amount of powder. Very few men like to shoot more than two and a half drachms, and some will not go that far. A reduction of weight, in those made for the American market, would greatly increase the sale of the article.

There is one rule to be observed in loading, for long shots, with *loose* shot—to increase the powder and dimin-

ish the shot. The reason for this is obvious: you need increase of power to penetrate, which you *cannot* have, if shot is proportionally increased with the powder. This rule is very often violated. Persons are apt to give too little attention to the *relations* of powder and shot in the charge.

I think that one of the first things a man should do, after (if not before) purchasing a new gun, should be to go out and try it, with all the numbers of shot from eight up to one, to ascertain what numbers it *disperses most evenly*. Supposing your gun to shoot *strong*, the next thing is this evenness of dispersion; and some guns do best with certain numbers, and some with certain others. Having ascertained which *your* gun affects, use *them* of course. My own opinion is that barrels finely finished *inside* show their superiority most strikingly in throwing the small sizes.

No man who knows anything about shooting, will ever use any other plain wad, than *Baldwin's* patent. Mr. Mullin informs me, that if they are saturated with melted *sheep's fat*, they clean the barrel admirably. I firmly believe this, and I especially believe also in the free use of oil on the inside and outside of a gun. This is considered heterodox by many, but I adhere to what I find to be of practical utility, in my own experience. Another excellent cleaner is *Eley's Patent Concave Felt Wad*. It will also improve the shooting of any gun. Shot disperse more evenly before it than before any thing else. In buying them, it is best to select a number larger than your bore, for then the concavity is less likely to be affected by ramming. The only objection to them is their high price: they retail here in Montgomery at $1 50 a bag. Nevertheless it is cheapest to use them at all such game as turkeys, ducks, &c.

I have gained some practical ideas by looking occasionally at the exhibit of the number of pellets to the ounce, of each variety of shot.

The following tables are taken from Hawker:—

| MOULD SHOT | NO. OF PELLETS TO 1oz. |
|---|---|
| LG | 5½ |
| MG | [hardly] 9 |
| SG | 11 |
| SSG | 15* |
| SSSG | 17 |

| PATENT DROP SHOT. | |
|---|---|
| AA | 40 |
| A | 50 |
| BB | 58 |
| B | 75 |
| 1 | 82 |
| 2 | 112 |
| 3 | 135 |
| 4 | 177 |
| 5 | 218 |
| 6 | 280 |
| 7 | 341 |
| 8 | 600 |
| 9 | 984 |
| 10 | 1725 |

Nothing I could add to this chapter would be half so useful as the following extract from "Dinks on Dogs," a most admirable little work;

"And now methinks I may safely add a few words on guns. This, of course, especially to the rising generation. I need not tell you not to put the shot all in one barrel and the powder in the other, though I have frequently seen it done, yea, and done it myself, when in a mooning fit; but I will say, never carry your gun at full cock, or with the hammers down, than which last there cannot be anything more dangerous. The slightest pull upon the cock is

* Best and most perfect of all mould shot.

sufficient to cause it to fall so smartly on the cone or nipple as to explode the cap. Positively, I would not shoot a day, no, nor an hour, with a man who so carried his gun. At half-cock there is no danger. By pulling ever so hard at the trigger, you cannot get it off; and if you raise the cock ever so little, it falls back to half-cock. or, at the worst, catches at full cock. Never overcharge your gun. Two to two and a half drachms of powder,* and one ounce to one and a quarter of shot, is about the load. For summer shooting still less. Never take out a dirty gun, not even if only once fired out of, even if you have to clean it yourself. After cleaning with soap, rubbed on the tow in warm, or better, cold water, without the soap, if not over dirty, remove the tow, put on clean, and pump out remaining dirt in clean warm water, rinsing out the third time in other clean warm water. Invert the barrels, muzzle downwards, while you refix your dry tow on the rod. Work them out successively with several changes of tow, till they burn again. Drop a few drops of animal oil—refined by putting shot into the bottle; neat's foot oil is best for this—on to the tow, and rub out the inside of barrels with it well. Wipe the outside with oil rag, cleaning around the nipples with a hard brush and a stick; ditto hammers and the steel furniture. Use boiled oil to rub off the stock, but it must be well rubbed in. Before using next day, rub over every part with a clean dry rag. Nothing is more disgusting than an oily gun, and yet nothing is more requisite than to keep it so when out of use. In receipts you will find a composition to prevent water penetrating to the locks, which ought to be as seldom removed as possible. I shall not tell you how to do this, for if you do know the how, where is

* I have been long satisfied that this is overcharging, and some of my most successful friends agree with me.

the necessity, and if you don't, in all probability you would break a scear or mainspring in the attempt, as I did, when first I essayed, and after that had to get the gamekeeper to put it together. So your best plan, in this latter case, is to watch the method for a time or two, when you will know as much of the matter as I do. If you want a gun of first rate workmanship, you will have to pay a swinging price. Fifty pounds for a tip-top London gun ; thirty-five pounds for a Westley Richards. One London gun will outwear two of Westley's. Why, I cannot say, but all his barrels are soft. Moore & Gray sent some eighty dollar guns to this country last year, the best and cheapest common guns I have seen. For finish, I would as soon have them as Westley Richards' guns. There is not much choice between any London maker, and there are several Birmingham makers fully equal, if not superior to, Richards. Always keep your powder dry, and in a dry place. Never shoot with anything but English powder, Curtis & Harvey's diamond grain, Hall's glass or rifle, both same quality, and Pigou & Wilks' best powder. There is very little choice between them. They are strong and clean shooting powders. Don't use too large, nor yet too small shot. Six, seven, and eight, are your mark for ordinary work ; for duck, from common gun, number four. Never leave your dog whip at home : you always want it most on those occasions. A gun thirty-one inch barrel, fourteen gauge, and eight pounds weight, is as useful an article as you can have. Never poke at a bird, that is, try to see him along the barrels. If you do, you never can be a good or a quick shot Fix your eye or eyes on the bird, lift up your gun and fire the moment it touches your shoulder. Practice this a little, and believe me you will give the pokers the go-by in a short time. It is the only way to be a sharp shot And now I will have done, trusting I have not wasted your time in reading so far to no purpose."

## CHAPTER IV.

### THE SETTER AND POINTER.

The dogs in universal use, for the hunting of game birds, are the *Setter* and *Pointer*. The *Cocking Spaniel* or *Springer* (which Forester considers to be the original stock of the Setter), is unknown in the Southern States, and can only be procured with great difficulty at the North. As he will probably not be mentioned again in these pages, it may be as well to remark that he is a very small dog, with some of the characteristic marks of the setter, but having a more *curly* coat and longer ears. He does not set his game, but indicates a near approach to it, by a slight whining. From what I gather about him in the books, I incline to the opinion, that he would be more useful here than in the Northern States. Every sportsman knows how frequently we are balked, by quail betaking themselves to thick black-jack and other coverts. For such ground the *Cocker* is said to be admirably adapted. Birds lie better before him than before the setter or the pointer. I therefore hope that our sportsmen will begin to import them.

The authorities are divided on the question of preference between the setter and the pointer. Each has its good qualities; each its defects. But I have not the slightest doubt, that *for this climate*, the pointer is the proper dog. His tender skin and liability to suffer with cold, are more than counterbalanced by his capacity to endure thirst and heat. In Alabama, at a moderate estimate, one-third of the shooting season, from first October to first

March, is made up of days quite too warm for the comfort of the setter. It is often too oppressive to the sportsman himself. The pointer can and does endure it, but the setter takes "fits" occasionally, and frequently compels his owner to cease his amusement, in pity for the sufferings of his dog.

There is another reason why the pointer is better adapted to the South. We have no professional dog-breakers here, and our sportsmen are lamentably *loose* in their ideas and practice of training. The setter *can be* subdued into perfect obedience and the most admirable performance; but with imperfect training and careless management he becomes utterly worthless, while the pointer is only comparatively so. This is the general rule; a few setters are as docile, steady and reliable, after having been once well broken, as any pointer.

I will add another objection to the use of the setter here. In a majority of instances, our shooting grounds are infested with that detestable weed which produces what is vulgarly known as the "cuckle-burr." It adheres in large quantities to the long and silky coat of the setter, gets between his legs and chafes off the skin, and makes him both ugly and miserable. It is not long since I saw a specimen of its effects, upon a very fine-looking dog, which had almost lost the power of locomotion by its terrible punishing. The short, satin coat of the pointer offers no hold to the vile thing; and a moment's reflection will convince the sportsman that this immunity is a vast advantage.

I shall conclude this chapter with a letter from Dr. E. B. J., of Macon county, a friend whose opinion on the subject of dogs or their training, I would rather have than any amateur's I know of. "By his works" he may be "known;" his dogs are the best broken in the State.

In chapter six I shall give a letter from Mr. G. W. Cooter,

of New York, a professional trainer of extensive experience, who has kindly furnished me with a description of his mode, which will be found highly interesting to the tyro. The subjoined shows Dr. J.'s :

"FRIEND H : Having promised to give you some few hints relative to the training of setters and pointers, I proceed to do so with due modesty, feeling my total incapacity, as I have had but little experience; yet, still to the mere novice, I may give some advice that may enable him, with his own judgment, to train his dogs to his own advantage. There are several modes of training—different ways for accomplishing the same end. I simply propose to suggest the plan that seems most simple to myself, which I have collected from books, my own *observation*, and the suggestions of others. Some authors will recommend you to discard the lash altogether; others to use it most freely. You may make a good dog with the lash; by its indiscriminate use spoil the best. My idea is, that it is next to impossible to train a dog *properly* without it; yet it requires the nicest judgment when, and to what extent, to use it. A dog should never be lashed until he is made fully to understand the *why*—or, it may be, in inculcating a lesson that you cannot otherwise enforce.

"Before giving our few lessons in training, it may not be amiss to give a few hints as to the selection of a good pup from the *litter*. I will mention what I consider the *ne plus ultra* of a good pup :—well formed limbs, wide between the eyes – eyes full but not too prominent—frontal sinuses well developed; the head broad and full; the poll large; muzzle rather long and only slightly tapering; ears rather long, very thin, and angular; tail long, small and tapering, presenting a very *rattish* appearance. I consider this one of the best marks of good

blood in the English Pointer. The hair short, thin, and very fine and glossy—this mark I regard above all the rest, as I think a fine silken coat indicates a nervous, active temperament—the sense of smell will be apt to be acute, and I think it almost impossible for him to be sluggish. In selecting a pup, one should suit his fancy as to color, as there are good dogs of all colors, but the lighter for the field the better, for reasons obvious.

"Now for sporting terms. I notice that H., in his 'Chapters on Shooting,' discards from his nomenclature one term I consider of much importance, i. e. *hie on!* This is one of the first I teach my young dog. I do not use it to make him flush, but there are many instances where it is useful in the field. Our young sportsmen (as I only write for very young 'uns, being one of 'em myself), will be better able to see its use after reading my few lessons. I think it all important that sportsmen should use as few terms as possible; yet I think that another phrase might be introduced into your nomenclature with benefit—it is *close on.* It is a slang term, not at all technical, but I use it with great convenience. I perceive that H. is *down* upon all slang terms, and the word *heed!* in particular, and I admit with some justice. Wishing to establish an uniform sporting nomenclature, I can but admit, I like the word on account of the force and emphasis with which it may be used. But concurring in the desire for an uniform sporting nomenclature, like himself, I will discard it, and henceforth use the more technical phrase, *toho!* or *ho!*

"Now for our pupil. We should take him in charge quite early—as early as the second month—I like to accustom him to obedience from his earliest *puppyhood,* to engraft upon his very nature *obedience*—and that you cannot do, but by beginning very early. I have *heard* of

dogs running wild until a year old, and then brought into training, but I have never *seen* one *properly* trained at that age. Such an one might satisfy the novice and pot-hunter, that know not what a trained dog is, but the true sportsman would kick such from his kennel. Our pupil's first lesson should be *toho ! steady ! hie on !* and if you admit my slang phrase, *close on*—(pronounced cloze on). These words you can very soon with patience learn him by means of a plate of beef, or such other food as he very much fancies. You should place a small piece of beef in a plate before him. Of course he evinces very great anxiety to 'pitch in.' You repress his ardor, by giving him a slight tap upon the head, crying *toho !* Of course he does not understand the meaning of the word, but every time he starts, check him with a tap, crying *toho !* with emphasis. After repeated trials, he soon associates the word with the slap, and stops of his own accord. After *pointing* for a few seconds, cry *hie on !* at the same time gently forcing him towards the plate. *Hie on !* he learns amazingly soon. A few such lessons and the words are learned, to be retained. The word *steady* is now easily learned, by making him approach the plate slowly, crying *steady ! steady !* at short intervals. When near the plate, cry *toho !* never permitting him to eat until you give the word *hie on !*

"The word *close on* should be used when you wish him to break his point, but not '*pitch in*' to the plate; before he arrives at the plate cry *toho !* and then *hie on !* when he has pointed, by the word *close on*, he must understand that he is to move cautiously, by the oft-repeated command of *steady ! Steady !—close on*, should not be used with the same emphasis as *hie on* and *toho !* With care, these words may be soon learned to the pup—recollecting never to use severity at this age, and that no other hand

than your own should furnish him with food, and always bear in mind that you are not to begin a new lesson until the old one is thoroughly understood.

"Your next lesson should be *down charge!* or either of the two words separately—as *down*, or *charge!* This he is made to understand by gently forcing him down, keeping his hind legs well up under him, extending his fore legs, and forcing his head gently between them, crying *charge! charge!* tapping him every time he moves. Practice him frequently in this position (using only sufficient severity to make him obedient), until he is obedient. Now to make your dog drop at the command, you should cry *charge! charge!* with your hand upraised; forcing him *rather roughly* into the required position, and by frequent practice, you will soon have him drop to the word. When you wish him to rise, cry *hie up!* at the same time gently raising him until he understands; this he will now readily do, as he already associates the word *hie* with action. When your dog behaves well, never fail to encourage him with caresses; when badly, let him be made to know and feel it. When giving this lesson, you should have your pupil within doors or an enclosure, so that he cannot play the truant. In this instance it may be well to pursue 'Dinks' plan—use a cord, fasten him to a peg; make him charge; walk off from him; if he attempts truancy, the cord retains him; return, lash him gently, make him charge again; walk off some distance, still crying charge! charge! always with hand upraised. You should practice him until he obeys the summons at any distance. You may now practice your dog every time you feed him, thus: place a portion of his food a few paces from him, make him *charge! close on! steady! steady! toho! charge! close on! steady! steady! toho!* (or *ho!*) *hie on!*

"Now to teach your dog to retrieve. First begin with

something soft—an old glove will best answer your purpose—first make him toy and play with it, then cast it a short distance from you—he will naturally chase it and return with it to you—encourage him with caresses. You should practice this often, always using the term, *hie, fetch !* when you send him after it, and fetch ! or *come in !* when you wish him to return. To teach your dog the word *come in*, you should use it upon all occasions when a short distance from you ; you may use it when you call him to feed him, &c. To teach him the word, you may let him accompany you in a walk, having a slight cord attached to him. When he plays too far ahead, check him, cry *come in !* if he pays little attention to the summons, draw him in rather roughly by the cord. When you wish to teach him the word *back !* or to *heel* (I prefer the word *back*), you should check him by the word *back ! back !* Make him follow behind you, and when he attempts to go ahead give him a tap with the whip (an article the sportsman should never be without). The words are very easily learned. Your pupil should be early accustomed to the call of an ivory whistle, when too far to hear the call *come in !*

"To return to *retrieving*. To teach a dog to *retrieve*, frequently requires a great deal of patience and perseverance ; but rest assured when once accomplished, you will be amply repaid for your trouble. You will sometimes hear your friend say, 'my dog will not retrieve ; he has no disposition to do so. I cannot make him,' &c. It is not so ! I believe any pointer or setter can be made to retrieve well. After all toying and coaxing fails, then you must try the virtue of the lash, remembering always to use it with moderation, and be very careful that you do not cow your puppy. This is the mode I would recommend. Within your room or yard where you will be undisturbed—recollecting that the presence of company,

man or dog, should be prohibited. First begin by placing your glove within mouth, make him retain it; if he rejects it, replace it, gently correcting him, crying fetch! fetch! After he understands the meaning of the word fetch, you may let him accompany you in a walk, in some quiet place. Whenever he drops the glove, you must gently and encouragingly replace it, crying, fetch! fetch! If he rejects it, then the lash must be used, though sparingly. If you study the disposition of your dog and manage properly, he will soon perfectly understand you, and gaily and happily gambol along side of you, never daring to drop his charge and if he should, he will only need the words, *hie, fetch! fetch! fetch!* to make him bound back with eagerness after the lost glove. You may now take the glove, cast it from you, and tell him to *hie, fetch!* he will immediately return with the glove. You may now let him see you drop the glove, walk off thirty or forty yards, waive your hand in the direction of the glove, and cry *hie, fetch!* he will of course regain the glove. After practising him at this often, you may drop the glove unobserved by him. He will soon follow your track for a considerable distance for a lost article, by receiving the command, *hie, fetch!* You may now give the glove to another person to hide, first permitting the dog to see it in his possession, and he will be almost certain to find it, if it is at all accessible. In your first lessons be careful that you place the glove where your dog will be certain to find it—not too far off. There is another term or *trick* I teach my dog, that is not absolutely necessary, but it is most easily learned, and I find it quite convenient in the field, and besides it somewhat adds to his accomplishments. It is *hie over*—a command to leap—often necessary to make your dog 'cross fence.' To teach him, you first cry *toho!* to make your dog stand; you then hold tolerably near him a piece of beef.

then use a stick as a barrier between him and it, making it necessary for him, to leap for it, upon receiving the command *hie over!* If he disregards the word *hie over*, use *hie on!* and afterwards *hie over*, until he understands, which he soon does by frequent practice. Very soon he can be made to over leap a chair or cane without the incitement of a dainty morsel. A few words of advice, and your dog is ready for the field. After your dog begins to retrieve, make him play with the ball—practising all the lessons with it that he learned with his *beef*. (I usually begin my first lessons with the aid of beef on account of the dog's great love for it, and because he is much more apt to *learn his lessons* for such a prize; but I think it very improper that he should be fed regularly with it, as it injures his scent). The ball that I have used and prefer, is the head of the femur of the ox, nicely covered with cloth; the reason why, he is less likely to *mouth* the birds after using such. He gets into the habit of taking up his ball easily, as otherwise it would hurt his teeth, it being of bone. Having made an innovation by the introduction of a slang phrase—i. e., *close on*—I must give my reasons for so doing. I have frequently been out sporting with dogs not trained to its use, and I have frequently experienced the greatest inconvenience. If the dog should have a good nose, and the breeze a little stiff, he will not unfrequently point a bevy, or even a single bird, thirty or forty, and even fifty yards. When such is the case, what is the usual procedure? Why, you generally see the sportsman begin to *kick* his dog on, step by step, thirty or forty yards—a sight not altogether sportsmanlike or gentlemanly, I ween. With a dog taught the word *close on*, the difficulty is at once overcome. You can always tell when your dog is very near a bird, so there is no need of flushing, by the too frequent command of *close on!*

"The young sportsman must recollect that he cannot train his dog in a day or a month, but that he must practice him for many montes; and even so long as the dog should live, he should never be suffered to forget his lessons.

"The above is all that I consider necessary for *house training*. If it should be desirable, I may give a few items to the young sportsman upon his first taking his dog to the field."

## CHAPTER V.

### FIELD TRAINING.

"FRIEND H: Having promised to give you my mode of '*Field Training*,' I propose to give you what I have found to answer best my purpose. Taking it for granted that your puppy Dash has had proper house training, you should select such grounds as will enable you to keep your pupil always in sight. He should be taken out alone at first, unless you find that he is deficient in action. When such is the case, you will do well to take him out with an old, well-trained dog, of fine action; and it will be well to take them to a field where you will *not* find game. Your object, of course, will be to get your pupil in the way of hunting briskly at a full gallop. He will soon get in the habit of going as you wish. Nothing looks so bad to the eye of a sportsman as a pacing or trotting dog in the field. Most thorough bred dogs will carry themselves handsomely. Taking it for granted that your dog now possesses fine action, you should take him to a field where you will probably find game. In beating the field, always go against the wind; do not let Dash play more than fifty or eighty yards from you, and be careful at first to quarter your ground, to teach your dog to do so—call his attention by a single blast of your whistle—waft your hand to the right diagonally across the field; when he has gone some eighty yards in the required direction, you will call his attention by another blast—wafting your hand to the left, going yourself in the same direction. By pursuing this course for a short time, you

will soon be enabled to cast him off to the right or left without trouble. Be careful to call his attention by a single blast on the call—to waft your hand in the required direction—pursue the same course yourself for a short time, and it will not be long before you will be pleased with the result. When you wish him to *come in*, when at an inconvenient distance to speak to him, repeat the blast upon the call three or four times. Dash, in his early days of puppyhood, will be sure to point sparrows and everything else having feathers that will nestle under the grass. For this you must not chide him too roughly, but simply call him off, and pay no attention to the bird; by no means shoot anything except game before him. By pursuing this course, Dash will soon heed nothing save game; but if he shows much perverseness, as some will at times, the lash must be used. You must expect frequently to have your patience sorely tried with your pupil. You must always keep him in sight, and when he does strike his first bevy he will be sure to point, if he is of the right stock, which I take for granted he is, as no true sportsman will take the trouble of training any other.

"After giving Dash house training and he should refuse to point his first bird, I would be disposed to turn him over to the halter. I have a dog which pointed his first quail when three months old, without ever having seen or previously scented one; at four or five months of age, he was as staunch as I could wish—I could control him on the point, making him charge, close-on, &c. He had thorough *house training*.

"When you observe Dash more excited than usual, you may reasonably expect a bevy near. They will not probably be far off, as he has not become accustomed to the familiar and welcome scent that will enable him to *wind* them at a distance. Now comes the trying hour for master and pupil. The former should be perfectly cool, and

should consider the killing of game a secondary affair—let him give his attention to Dash. The dog seems too eager for the scent—you cry steady! steady!—if he is apparently near the game, and you are afraid he will flush, you cry toho! You approach and find the quail do not rise—you tell him to close-on, which he does by moving rather rapidly—you check him by crying steady! steady! he points, toho! You now approach and flush the bevy; be sure you bring down one bird, and it will be well that you only fire one barrel, that you may have more time to look after Dash, who of course scampers after the whirring bevy. You immediately cry toho! come in!—on, on he goes; in his wild excitement he disregards your will entirely. You now use your whistle. By this time the birds are out of sight (but you, of course, have marked them), and he is running helter skelter. You must soon get hold of his collar, drag him rather roughly back to where he *pointed*—lashing him slightly—and make him *charge!* and keep his position until you reload; after which you will take him to where your bird has fallen—indicate the place with your hand, crying *hie fetch! fetch! fetch!* From his previous lessons he will know that you wish him to look for something, and his nose will soon tell him what it is. Do not let him mouth or toy with it, or he will soon get in the habit of roughly mouthing your game, than which I scarcely know a worse habit.

"You may now rest for a short time, that the bevy may get over their fright; after which they will be more easily found, for if they have been very much frightened, they will not give out sufficient odor to enable your pupil to point well, and he may consequently flush them, thereby doing great harm. You cannot do better than to spend your time in repeating your house training with the dead quail: casting it from you, telling him to *close-on! steady! charge! hie-on! fetch!* Cast it some distance unobserved

—waft your hand in the proper direction, and tell him *hie fetch ! fetch ! fetch !* After a short time has elapsed, you may take Dash to where you have marked the birds. When near the birds, keep Dash near you, that he may be the more easily controlled. If he seem too eager, he only needs the command of *steady !* to control him. Let the command be in rather an undertone—never get into the snobbish habit of *bawling* at your dog. Apart from its being an ungentlemanly habit, it frightens the quail more or less, and they will not lie so well to the dog. Ha ! but Dash has *come* down to a point most beautifully, toho ! You carefully approach, flush and shoot the bird, and immediately give your attention to the dog, crying *charge !* in a strong and emphatic tone; if he breaks, get hold of his collar as soon as possible and lash him, and at the same time drag him to his *point* and make him *charge* and keep his position until you reload. You then cry *hie-up*, make friends with him, and cast him off—he soon points again. You manage to get very near the dog, and when you fire, immediately cry *charge !* and it would be well to accompany "the word with a blow," at this juncture. You make him charge, reload, cry hie-up, indicate the point where the bird has fallen, and command him to hie fetch ! He gayly and gladly does your bidding without mouthing your bird. You cast him off again, and *always* manage to control him after you fire—*never, never* suffering him to break shot without feeling the lash. Remember this is the most critical time for yourself and dog. Never suffer yourself to become excited; do not for some time fire more than one barrel, that you may sooner give your attention to Dash, and you will accomplish much if you can be near enough to Dash to give him the lash as he first springs from the point, at the same time crying, *charge !* If you do not suffer yourself to become excited, and lose sight of your dog after your shot, you will soon

have him to drop at the report of the gun; but rest assured, if you let him have his own way a few times, in your eagerness to secure game, you will rue it for many a day to come. You cannot have this fact too strongly impressed upon yourself. If you control him *from the first*, your object will be attained. If Dash evinces unusual perverseness in this, it will be well to make him *charge* while on a *point*. Even should he see a dead bird fall, he should not retrieve without permission.

"Should you wing a bird, do not suffer him to chase it. It is far better that you shoot it again, or that you lose it, than he chase it. You will see the importance of *house training*, and the command *charge* in particular. It matters not at what distance Dash is from you, or how excited he may be, he must be taught to obey the word. More fine dogs have been ruined by suffering them to break shot when young without proper correction, than in any other way. Make this a *point* to be attained, and when secured you have a trained dog, as everything else is early attained. With the exception of making Dash *charge* when there is a bevy whirring about him, he may perform as well as any old and well-broken dog. You can make him *close-on*, *steady*, and *toho*, and keep him upon the point by the command as long as you desire. Never suffer him to flush the game for you, or you may ruin him. I came near ruining the best dog I ever owned, by making him flush. He was very young, and under perfect control: I could make him point, close-on, and hie-on to a bevy when I wished. I began by making him flush for me when under thick cover, so that I might have a better snap shot, by being at a proper distance when the bird first rose from the ground. After behaving beautifully for a short time, he concluded that he understood his duty better than I did; consequently, after pointing as long as ***he*** thought necessary, he would flush without regard to

the command. Sorely, sorely did this mis-step trouble me before I broke him of the habit; but by patience I finally succeeded, by making him *charge* upon the point, and flushing myself."

"When your dog points a hare, be sure to shoot it in its form, and never let him chase it. It is impossible to keep him from sometimes pointing it, but you can and must prevent chasing."

# CHAPTER VI.

## REMARKS ON TRAINING

THE most that can be done in the way of conveying instruction, in regard to the training of dogs, without practical illustration, is to state the results to be attained, together with an outline of the mode by which to reach them. In practice, the details will necessarily vary very considerably. One man will find this mode, another that, to be most efficient; besides which, the disposition of the particular animal sought to be controlled, will in a considerable degree affect the character of the training to which he is to be subjected. After all, the knowledge which is to be imparted to sporting dogs, is comprised in the understanding of a very few terms—and the great idea in their education is the enforcement of a *prompt, unhesitating obedience to every command.* For myself, though no great advocate of the whip, I believe that no dog, up to the highest standard of sporting finish, has ever been turned out, without having the great principle of obedience flogged into him, very early in life. A dog may be *coaxed* into performing the *charge*, in a slow, slovenly, reluctant manner; but whenever you see him drop at the crack of your gun, as if the load were driven through his head, you may set it down that *that* dog associates promptness with escape from severe punishment. I may be wrong; but my opinion is, that those who would discard the whip entirely, are persons who would not in the field, among dogs which found and pointed birds, know the difference be-

tween a perfectly well-broken pointer and a "pot-hunting cur."

In my last chapter, I gave the mode adopted by a friend whose success is equal to, if not greater than, that of any Southern sportsman I know. I now present, in his own words, the method of managing dogs practised by Mr. C. W. Cooter, of Havana, New York, a breaker of great experience, and whose establishment, though not large, will be as apt to supply a well-bred and well-broke dog, as any in the country. Mr. C., it will be observed, for convenience, adopts the dialogue form, the purchasing visitor being supposed to be inspecting his kennels:

### MR. COOTER'S METHOD.

"C.—As you are desirous to know my method, sir, I will just take this black and tan setter bitch—she is three years old, was brought over the water, and I got her for sixty dollars. Although well broke, she does not come up to some that I have broke in this country, and so I have found all English broke dogs; the habits of the birds and the covers are so different, that a dog takes two years to become acquainted.

"She was last put to the black and tan dog two years old. You see they resemble each other in shape and style of movement; these points I consider of great importance."

"H.—Do you not think that the dog would get stronger pups, was he, say, three or four years old?"

"C.—Unquestionably; but then as I have none older, I prefer the colors to match, than to put that splendid red dog, although I would do that in preference to any other colors."

"H.—Then you think colors ought to be attended to as well as form?"

"C.—Certainly I do; and disposition, constitution and

purity of blood, ought always to be looked at, and then we should not have so many indifferent pups in a litter. And I would beg to state here, that I would not cross a setter and pointer upon any account. I have bred many litters, but the trouble comes in when you require to continue breeding. I go for *pure setter* or *pure pointer*."

"H.—In that, sir, I agree with all my heart."

"C.—When I perceive symptoms of the bitch comingin heat, which she will show five or six days before she will take the dog—I place her and the dog in a safe room together, so as to play—by so doing, I find that the bitch will become more attached, and therefore *mark* her pups more after the dog. As soon as I have seen the bitch stinted, I remove the dog for a day, and then place them together again for another twenty-four hours. I then remove the dog entirely, and as soon as the nine days of heat are *over*, I let the dog and bitch take a walk with me, and if no inclination is shown in the bitch for the dog, I consider her safe to go nine weeks from the first stinting. As I feed all my dogs with boiled Indian meal mixed with cold milk, the bitch gets a share, but if she gets too fat I put her under chain."

"H.—Would you recommend flesh to a bitch?"

"C.—By no means, as that often breeds mange and humors, which will come out on the pups. I provide a warm bed in a shady situation, and always leave the bitch alone to pup—give her a good clean bed of pine shavings, and remove the dead pups the next day. Let the pups be well fed on new milk and *old* corn mush as soon as they will eat; wean them at five weeks. By applying brine to the slut's teats, you will soon dry her up and have her ready for a hunt. I always let the bitch be loose when suckling her pups."

"H.—Would you use medicine at such times?"

"C.—If a bitch or dog is sick, I go to the Field Sports of

'Herbert, or 'Youatt,' and take a recipe for the disease, but at all other times I use nothing but stone sulphur in their drinking water."

"H.—Do you keep setter and pointer pups in the same kennel?"

"C.—I prefer not, as I think the pointer requires a warmer house, and so I act, letting the pups out for a run once a week. I couple them two and two together until the open fields are reached, and then turn them loose, and always walk slowly myself in a zigzag way across the field. By so doing they will acquire the habit of quartering their ground. Should any attempt to scale the fence before you, turn your back on him and walk off, giving one sharp whistle—of course you will use the whistle and gun at feeding time every evening."

"H.—But would you not commence breaking the pups in the house?"

"C.—No, sir! I have broken many dogs in England, and have handled nearly five hundred in the United States, and my plan has been to let the pups be exercised in the above way, until they are ten months old. I never take a gun in the field, but allow them to hunt and chase without chiding them; by so doing I find they acquire the method of finding birds when they have secreted themselves—it gives them a bolder appearance, and confidence in themselves."

"H.—Why, this is a new idea, and I must know how you proceed."

"C.—As soon as I find that a young dog has got bold in his gallop, and hunts for game—supposing him to be from ten to fourteen months old—I take him with one or two well broke dogs, out very early in the morning, and let *him* run for one or two hours. He will then become a little tired, and in that time will have scared up some game, so that I will know where to take him back to find; but

*before I do so*, I couple the pup with *one* old dog; as soon as the single (broke) dog points, the other broke dog will back him; or if I hold up my hand, he will stop, which compels the young one to do so; if not, walk up to the pair, and *push* the pup down; he will get up, then push him down again, and continue to do so, saying each time '*charge!*' but not aloud, to scare the game—a good box on the ears with the hand will assist this first lesson. Walk backwards each time towards the pointing dog, then *kill the bird;* the well broke dog will not move whilst you *stand still yourself.* When the gun is re-loaded and capped, say '*hold up!*' or '*whistle;*' this will start the three in motion; the old dog will be sure to *point* the *dead bird.* The word '*toho,*' or '*charge,*' will stop the pair, and another box on the ears will get the pup on his belly. Then I pick up the dead bird myself, and walk back to the pup and show it to him—see that he smells the feet, but should he desire to bite it, say '*charge!*' or '*toho!*' and press my foot on his toes; this tells him he must not catch it. From the time the point was made, you have wasted half an hour. I then follow the same system for an hour or two; if I do not find game, I discharge the gun at times, and make the dogs 'charge,' and after re-loading, drop my dead bird, *unseen*, and then call the coupled dogs up, showing them as before; by this time the pup has become docile without the whip. You can then let him loose, but put a bed-cord on him, with a 'rag' at the other end. He will commence hunting, and should the old dogs make a point, or you think the pup is on the scent of game, walk quietly towards the rag, step on it, and as that stops him, say '*toho!*' Should he be anxious to get on, take the cord in your hand, and jerk him back a foot or two—then say '*steady!*' and as he draws on, stop him again and again, until the bird is '*pointed,*' and then shoot the bird on the ground, if pos-

sible. Do not 'yell' or scold, but be as cool as you would in sitting down to dinner among ladies. I have followed this plan for years, *when alone*, and never knew it fail. But let me here state that a man cannot do it who is *desirous to obtain game*. I am well pleased if I can kill from three to five birds in a six hours' tramp. As soon as the young dog begins to lag, kill a few birds over the old ones, and they will be well pleased with their day's work. The next day take your young dog with one old one, put the check cord on the youngster, and see that he does not *commit a fault*. Should he be a wilful dog, you must whip him; but the check cord will do *wonders*, if the master is particular to attend to the young dog. He will now begin to point his game well, and do not by any means allow him to get hold of a bird, but keep him to drop at the discharge of the gun—when told to '*hold up*'—to draw up to the dead bird and *point* it, and then pick it up *yourself*. In three days your pup will be quite a dog. Give him a day's rest at times, but keep at him a part of three or four days a week for six weeks. If the dog is intended for yourself, I would not allow him to 'fetch' the first year; but as I have to break dogs for gentlemen, I have to teach them to 'fetch' before they go home. I therefore adopt the following plan:"

"H.—Do I understand you the pup has not as yet been taught to 'fetch' anything?"

"C.—Certainly, and for this reason: A dog that has been taught about the house, is often fooled (by a boy) unknown to yourself, and when you desire him to 'fetch,' he will then often cause you a great deal of trouble, and sometimes become hard mouthed; and again a dog that is taught to 'fetch' will often break '*shot*' when he sees the bird drop."

"My plan is this: After shooting over one or two—I prefer three—young dogs, and they have become per-

fectly steady to *point game*, to '*back*' another dog, to 'drop' at '*shot*,' and to point a dead bird, I take a single dog into a room, and then show him a live winged bird—*game, of course*—after holding the bird and playing with the dog a few moments, I cast the bird from me, saying at the same time, '*fetch*' it, in a kind voice. He will most always do so; if not, play with him again, open the door, and toss the bird into the darkest corner of the room. He will then lift the bird, and as he comes out of the door, catch him, and take the bird away, and reward him with a piece of cake. I follow this plan two or three times a day, taking care not to tire the dog of this *new sport*. Keep him from the field for three days, and then take him *alone*, kill game, and see that he *points* his *dead bird* as before, and then tell him to '*fetch!*' Should a young dog lift a bird before these lessons, do not chide him, but speak kind, and walk from him immediately. He will then come running after you, and then take the bird, but do not recompense him by flattery.'

"H.—Well, this is a new system, for I have always considered that a dog must be broke under the 'whip.'"

"C.—The whip is a good article in its place, for an old, headstrong dog, but the *check-cord* is better even than that in such a case, as it does not cow a dog down like the whip. I *never walk* up a bird, but, let the dog be ever so staunch, stoop down and pat him, or even *push* him—for this reason: how many good shots you will lose if your dog will not go into a piece of thick brush, and let you stand on the outside! Should a dog jump on to his game, walk so as to be able to tread on the check-cord, every foot; this will make him *creep* like a cat up to his bird. Should a dog puzzle or nose the ground, stop him at once by the puzzle peg, which is made in this way: Take a piece of pine board nine inches long, whittle off six inches to the size of your finger—the other end should resemble the

palm of your hand. Fix four wire staples at each corner to run a string or small strap to; tie one string at the back of the ears—the other should slip over the tusk of the lower jaw. I once shot with a keeper in Kent, England, who always used it, and his dogs were noted for the style they made their game at a distance."

"H.—Well, sir, I have heard of your dogs being well broken, and I will take a pair. What are your prices?"

"C.—We charge $60 for a pointer or setter that does not fetch, but broken to point live and dead game, and drop at shot, $75, for either pointer or setter that has all the above qualities, and 'fetches.' Should you like your purchase, you or your friends can send us a draft, and state the size they require, also the three best colors they approve of, and we will ship them by express from New York City."

# CHAPTER VII.

## ADVICE TO THE SPORTSMAN.

Among the various contributions I have received from sportsmen in different sections of the country, I find the two which follow. It may be said of them, that each inculcates a good lesson to the gunner. The first illustrates the folly of some good men and good sportsmen in a certain particular; the second, how egregiously the inexperienced hand may be deceived in the character and capacity of a dog. And I will take occasion here to remark, that in my opinion very few dogs are ever too impetuous, or, as it is often termed, *high-strung*, if training is commenced *sufficiently early* and continued assiduously and without interruption. It is, however, a settled thing in my mind, that an animal of the highest degree of courage and game, cannot be allowed to run wild until he is from six months to a year old, and *then* be broken into perfect steadiness with any reasonable amount of drilling and punishment. *Me judice*, the proper age to begin the training of a puppy, is from six weeks to two months. Any puppy of that age can be taught, *in from ten minutes to as many hours*, to obey the order to "*charge*," with perfect promptness. Nothing else need be taught him for some little time; but a constant practice of *this*, until it becomes a "second nature" to obey it *like a flash*, with his quarters handsomely under him, his paws extended in front, and his head between them *and well down on the ground*—and to remain, with the passiveness of death itself, for half an hour, if required. Day in and day out, should he be

practised at this duty, and the more regular and the longer the lessons are, the better dog will he be.

The sketches I subjoin are from a Northern sportsman, to whom I am already under obligations. I give first—

## GUNS UP!

### OR, A DAY WITH A GOOD SHOT.

Speaking of the improper and careless way in which some sportsmen handle their guns, brings to mind a day's shooting I once had with one of the quickest shots I ever hunted with. We will term him Frank, for convenience. He had written me to inform him when I would have two or three dogs for sale, and the most convenient time for him to come and try them. In answer, I wrote him that I had three, whose colors grouped well together, and which matched well for *size*, *action*, and *temper;* and the best time for a trial was about the first of September in the North. He came as appointed, and after a late dinner and segars we retired early to bed. Frank was up early, and dressed for shooting—a clean, laminated steel seven-pound gun, diamond powder, and number seven English shot—a pocket full of caps, and a small flask of brandy. Thus equipped, after breakfast we started for the stubbles close by my house. The dogs had been let loose for an hour, to empty themselves, and now went off with the word *hie-on*, in a dashing style. I will here describe the dogs: "Czar," an orange white setter; "Shot," a red and white, with black tinge on the red, setter; and "Don," a fawn and white pointer. They were all two years old, and the price I put on them was $260. I noticed at starting that Frank handled his gun in a careless way, and told him that a gun pointed continually at me was often the cause of making me nervous. His reply was, that I need not fear him, as he had shot for years. As I said

above, the dogs went to work in a gay style, and soon crossed a couple of fields; when, as we mounted the third fence, a fine bevy of quail raised and dropped into a corn-field close by, and as the dogs went up the wind, "Czar" made a *point*, and as I whistled "Shot" and "Don" turned in their range and backed him; but as he commenced drawing, the three were soon together—each one anxious to make the game, but as I had marked the birds, we went on, and in the next field "Don" and "Czar" pointed together, 'Shot' backing them a short way off. We now walked quietly up, and as we came within three or four yards, the word "*hold-up*," in a gentle voice, caused them to creep on towards the game; and now the three form a picture—each dog points in a different attitude, with tails straight, necks extended, and lips quivering. I asked Frank if he thought that style suited him. He exclaimed, "The *sight* is worth a journey to see!" and at the same time up went the old cock quail. Frank dropped him in a moment. The dogs dropped at the discharge of the gun, and as I had loaded and capped, a whistle of gentle tone caused them to raise quietly and point staunch. A whistle, and they creep like cats for a few yards, when "burr," "burr," and the whole bevy flew in a scattered form in all directions. I dropped my single bird, (shooting as I do with a single-barrel gun). The dogs "charged." I then turned to Frank, who said he had got a pair down, and had marked the rest in the same place as myself. We now re-loaded, and the dogs being *hied-on*, they went up to the place where the birds had lain, and then on to the dead birds, which they pointed. I asked Frank to pick up the bird under "Don's" nose, whilst I picked up the single bird and turned to find Frank's other brace. The dogs hunted them carefully, but only found one, and as they seemed to trail towards a ditch, I got Frank to go and stand above it, whilst I went

with the dogs below to *give* them the *wind*, and as the dogs hunted carefully, I observed the winged bird dodging among the weeds; and getting within a couple of yards, I took the liberty of removing its head. This plan I prefer, sooner than let the dogs chase after it, as that often causes dogs to flush the next birds they come to. While re-loading, I was startled by the shot of Frank's gun whizzing by me. It appeared, by his account, that he had placed the gun across his shoulders, and in turning around, the cock caught by a twig which raised it sufficiently to strike the cap and explode. He had shot a sapling asunder just about the height of my head, which caused me to think it a better subject to experiment upon than the head of a father of six children.

We now went on. Finding three bevies more, Frank bagged his pair out of each; but as to myself, I was sufficiently engaged in *trying* to dodge the muzzle of Frank's gun, as he sometimes dropped the same in a line for my heart, as we mounted a fence, or grasping it with both hands across his shoulders. He had became so much accustomed to do so, that his accident nor my continual caution of "guns up!" had any effect on him; and he is not the only good shot that has this bad fault.

We now crossed an old pasture field covered with whortle berries, and as the dogs neared a corner down by a swamp they all showed symptoms of game, and as we came near them, stood in a bold style—when "whirr, whirr," went a pair of ruffed grouse, and Frank made a handsome right and left of them. While he was re-loading, three more got up, one after the other, giving me a good shot. "*Hie-on*" to the dogs, when three more birds fell to our guns; one being hit in the eye commenced fluttering, which tempted "Shot" to break from "*charge*," and dashing in flushed the rest of the grouse; which offence was rectified by my dragging him *back* to where

he started from and administering a good strapping, accompanied with the words "*charge!*" "*charge!*" After making friends with the three dogs, by patting them, they commenced pointing the dead birds. "Czar" had ranged into the swamp, and on my calling "*fetch*," he soon returned with a winged grouse.

We now turned towards the places where we had marked the different bevies—Frank shooting in a most splendid style. Except the careless manner of pointing his gun in the direction of your humble servant, and holding his hands over the muzzle when seeing me correcting the dogs, he was perfection. We now entered the corn field, and as I cautioned the dogs with the word "*steady*," cock after cock got up, but the corn was so high and the weeds so thick, we could not shoot, or see our dogs; and the cocks not being expected there, I proposed to leave them for after lunch, and then use my pair of spaniels. Therefore, taking a line for the house, we crossed the wet grounds that led into the swamp, and something close to the dogs flapped up and down again by a bush so quick that I could not tell what it was; but the dogs going on soon came to a faint point, and "sceap," "sceap," went a pair of jack-snipe,—bang, bang, bang, and not a bird. I chided the dogs with "*Toho! toho, sirs?*" and then loaded my gun. "Shot" and "Don" now went off to the left, making a stiff *point*, while "Czar," on the right, was retrieving a dead snipe, one of the pair he had marked better than us. We now had a dozen good shots, bagging nine snipe. We then went to the house for luncheon and some home-brewed ale; then taking a segar, we rested ourselves until three o'clock. I then chained up "Shot" and "Czar." Calling "Don" to *heel*, we started with "Dash" and "Busy." These small cockers were handsome—but are *not* the *kind* I would recommend to the young Southern sportsmen.

The dog best adapted for their use is the Sussex spaniel. I have seen them in my native town of Lewes, England, as large as a small setter, with ears from six to eight inches long. Such dogs would be of immense value in cover hunting. Here I would make a mark: As we crossed the field, Frank found a quail in his outside pocket (he had forgotten to search), and placing the butt of his gun on the ground, he held the bird up for me to see, and while he was so doing "Dash" jumped up to get the bird, and as his foot came down, it caught the cock of Frank's gun; and as the hammer was *down* on the cap *(instead of being at half-cock)*, another explosion occurred,—taking fortunately nothing but Frank's hat brim; but had his *hand* been on the muzzle, one of the best shots in the United States would have been minus a finger or two.

I now sent "Dash" back to the house with the dead Quail. He soon returned, and we then went on towards the cornfield, which was a wet one, and telling Frank to get on a stump in the middle, I *hied-on* the spaniels. As they went barking around, the cock fluttered up and down in all directions, and as Frank shot and loaded as quick as he could, "Dash" retrieved me seventeen good autumn cock, in less than two hours. As Frank had marked a few birds down off by a piece of sprouts, I coupled up "Dash" and "Busy," and then got some nice points with "Don." Bagging a few birds, we crossed a stubble and found a bevy of quail, which finished our day's sport.

On counting our game, we figured thirty-seven quail, six ruffed grouse, twenty-one woodcock, and ten snipe, which I think, in the North, a good day for three barrels and no marker. Frank, in his letters, when speaking of his "Don," "Czar," and "Shot," concludes with "Guns Up!"

The reader will not fail to note in the following how terribly severe was the training required to subdue a high-spirited dog—unsubdued by previous *early* discipline and steady work :

### DOG DEALING, OR TAKING A LESSON.

Some twenty years ago I was presented with a splendid silver-and-white Pointer, of noted stock, in the south of England. Being young myself and my old dogs nearly worn out, I named him "Ponto," and if a dog was ever worshipped, I believe "Ponto" was my idol, and at three months old he would "*fetch*" and "*charge.*" I believe he was as well house-broke as a dog could be up to six months of age, when I thought I would commence shooting over him. I must here state that the stock of "Ponto" was once so fine that a fox hound was introduced, which gave the breed plenty of foot, and of that "Ponto" was a miracle. Well, I hunted "Ponto" nearly three months, and could do nothing with him when he came on game ; although he would point a winged bird in the house, &c. One day a friend who shot on an adjoining estate, came to a spring where I was drinking, and offered me a very nice pair of broke dogs for "Ponto." I told him I could do nothing with him except *show him in the house or yard.* His answer was, that if *he* could break him, he would suit him, instead of paying a duty on two. I traded, and had by far the best of it, as I thought ; but judge of my surprise, when I received an invitation to shoot with my neighbor two weeks afterwards over "Ponto." I went with reluctance, as I expected to be annoyed as of old, and even took my pair of dogs along. But Bill said "Ponto" would do all the work we would want, and so it proved—notwithstanding the wind (it being in November). We shot over "Ponto" six hours,—killing pheasant, partridge, and hares over

points,—Bill not speaking a harsh word to the dog all day. The dog retrieved, after pointing dead in every instance; and before the day was out, I offered ten guineas and the pair of dogs back, but I never was the owner of "Ponto" again. After dinner Bill gave me his method of fixing "Ponto," by stating that he got the dog fond of him, and on the fourth day put a large bag of shot round "Ponto's" neck, and then mounting his horse rode the distance of forty miles—the dog ranging where he chose. The next day the same dose; and as soon as he got home, took some dinner, and put a long cord on "Ponto," the shot remaining around him besides. At three o'clock "Ponto" was going over a stubble flushing the remnant of three coveys of Partridge. Bill then took him to where he had marked the birds, and by continually placing his foot on the cord compelled him to stop without speaking to him. He continued this until the dusk of evening, when he and "Ponto" went home well-pleased with each other, and both tired out. Early next morning Bill took his gun and commenced hunting in earnest, with "Ponto" fixed as before, and, after paying particular attention to "Ponto," succeeded in killing six partridges over points. He now hunted him four days longer with the cord, and then hunted him loose as I had done, and the result can be seen from my day's hunt with him. Bill was offered long sums for "Ponto," but said as he could do a week's work as well as a brace, he was what he wanted. Since then I have handled nearly five hundred dogs, and have never seen "Ponto's" equal. I am satisfied that it was my fault and not "Ponto's," as I commenced letting him "*fetch*" in the field, before I taught him in the field to "*point*" game, and I never gave him—he being so high-strung—sufficient work, and was too anxious to bag game.

# CHAPTER VIII.

## ON THE SHOOTING OF QUAIL.

BEFORE introducing a portion of a chapter of *Forester's Field Sports*, I propose to offer some remarks of my own, in regard to the shooting of *quail*. Hereafter I shall give the experience of a friend of mine who has given a laudable attention to the habits of the bird and the mode of hunting him.

Perhaps I shall have no better opportunity than just in this connection, to express the contempt with which every well-bred man must view the practice of taking quail in *nets*. It is a practice which obtains quite extensively in this region, and which will continue while gentlemen sportsmen treat those who are guilty of it as anything else than pot-hunting vagabonds. I do not mean that all who indulge in the villainous practice are worthless characters—though a majority of them are—but that the thing itself is so vile an outrage upon all sportsmanship, humanity, and magnanimity, that no man who *knows better* ought to countenance his best neighbor if he will not discontinue it. We have now in Eastern Alabama a great abundance of quail, except in certain *netting* localities. Where they are taken in that way, the bird is absolutely swept away, in particular neighborhoods. I have known a thousand birds captured within a week, by two or three parties using these infernal machines during a cold, sleety spell of weather, when the quail is always loth to take wing.

Another mode by which the quail is decimated, at least,

is by traps. These are set mostly by boys and negroes, in plantation enclosures. Two or three active sportsmen, however, will generally keep trapping down, by kicking the little pens to pieces wherever they find them; and they are almost certain to come upon every one within the range of their shooting. Those who take an interest in the preservation of *game birds*, ought by all means to prevent their servants from trapping the bevies which feed on their plantations.

There are a good many yet who are disbelievers as to the faculty of withholding its scent, which most sportsmen attribute to the quail. The fact is of such frequent occurrence, that I should despair of making a fair sportsman of any one who had never noted it for himself. A majority of bevies will resort to this means of self-preservation the second time they have been badly worried by the sportsman. I have observed that the full bevy attacked for the first time rarely does so.

When it is discovered that birds are withholding the scent—that is, when, after having accurately marked them, your dog fails to point upon coming where you *know* they settled—the best plan is to go off and sit down for half an hour. Rest your dog and yourself. By the time you have accomplished this, if you will return to where the birds settled, depend upon it, your dog will begin to *come down* handsomely. I have tried this time and again, and I do not remember that it ever failed.

In regard to *running bevies*, there is one point as to which I differ with *Forester*. He recommends, when the bird is disposed to act thus, an attempt, by taking a circuit, to come around on the opposite side, which is likely to make the birds stop and huddle. This it undoubtedly generally does do; but in this country, if you attempt to cut off the bevy from its covert in the branch swamp or the blackberry briar patch, it will lie until you kick it up

almost, and then whizz under your very nose in the original direction. I know no more awkward shots than those thus obtained. I prefer following the birds, with the precautions mentioned by Forester, (checking the dog with *steady! steady! toho!)* When they reach the grass at the edge of the swamp, or the old fence near by, ten to one they will lie. You put them up, and take the chances for snap shots as they pitch into the covert. I have had a pretty good experience in heading off bevies, and my deliberate opinion is that it will not pay.

The morning—early morning—is much the best time for shooting quail. The heavier the dew, or frost, the better. It has two advantages : the birds lie better, and the scent is much stronger.

The dry sedge fields (that is, fields turned out to rest, and grown up with tall sedge grass,) afford the finest sport. The birds, however, seldom frequent these to any great extent until the peas of the cornfield are exhausted. While these remain, the quail lies close by in his covert, and a very short time, morning and evening, suffices to fill his craw with his favorite grain. However, if you can find sedge surrounding a stubble field, lately in oats or wheat, you may expect great sport early in the season.

In shooting quail, most persons fire too soon, and in their ardor fail to hit. The truth is, if two birds are simultaneously flushed and fly off in different directions, there is just about time enough for a fair shot, of good nerves, to kill both, cleverly within range. Your first bird may be taken down at twenty to twenty-five yards; your second, at thirty to forty-five. But the tyro *will* bang away as soon as the birds get up ; and it takes some time to show the green hand the absurdity of shooting without aim, through the just-risen bevy, expecting to kill a dozen, more or less. It is seldom that more than one is thus got, and it is generally mangled, because the

shot have not had time and distance enough to disperse properly. I was always the awkwardest of hands to shoot at bevies, and, finding this to be the case, for convenience sake endeavor always to take down the extreme bird on the right and on the left. This prevents, to some extent, the confusion that besets me inveterately when I keep my eyes on the centre of the whirring crowd.

Marking birds accurately is very difficult. It can only be acquired by experience. Green hands are invariably deceived. *Forester* gives as a rule (and it is a good one), never to believe a bird settled no matter how low he may have been scudding, at a particular point, unless *you have seen a flap of his wings.* He is down then, *sure!*

I give now an extract from *Forester:*

"I have found it impossible to get up early enough to do execution from any country tavern, if one waits until a hot breakfast is prepared. My method, therefore, is to take with me a cold ham, or a cold hunter's round, and to have the table laid over night, in addition to that, with bread, butter, and cold milk, on which, for my part, I can breakfast very satisfactorily.

"This done, if you know the country, go to the place where are the most and likeliest grain stubbles lying near to good woodland or coppice covert, and beat them regularly, in such a manner that the woods shall be down-wind of your beat. Let your dogs, however, beat every field up-wind, by which means they will scent their birds one-third farther than if you go down-wind.

"Look especially to the sides of the field, particularly if they are bushy; quail do not affect the middle even of the stubbles on which they feed.

"If your dogs trail a running bevy, never run or hurry them. They are, if you do so, nearly sure to flush them wild. Be, on the contrary, very steady yourself, and cry "Steady! steady! toho!" words to which dogs should

be accustomed early. If they point firmly, and are so very staunch that you can depend on them, it is not a bad plan to make a wide circuit, and get ahead of the bevy, which even if wild and running, will often squat on finding itself enclosed between the dog and the gun, and thus afford good shooting.

"If you drive a bevy of Quail into good covert, be not in haste to follow it. It will stay there, be sure; and you will find them far more certainly after half an hour has elapsed. For myself, I have found it the best plan, where woods are small, and the covert thick, to go on beating the open fields, without following the bevies at all, in the first instance, marking them down carefully when they rise, until the feeding and running hour has passed,—then to follow bevy after bevy, whither you have seen them alight; and knowing their whereabout, if not the exact spot where they lie, the dogs will soon find them.

"Otherwise, if one wastes the morning in killing off one bevy, by the time he has done with it, the birds will have crept away into their hiding-places, and he may hunt the wood-skirts and brush-holes all day along, without finding another, even where they abound, unless he blunder upon one by chance.

"During the heat of the day, if one have not found birds in the morning, although it is pretty much chance work, bog meadows, brown bushes on southerly and westerly hill-sides, old pastures with much bent and ragwort, and the skirts of coppices, are generally the best ground, though in some regions they will be found in large open woodlands.

"In the afternoon, soon after four o'clock, the bevies again begin to run and feed, and in this part of the day they will frequently be met running along the grassy margins of streams which flow through pasture-fields,

whither they resort to drink, or at least to crop the wet herbage.

"So good is the chance of sport at this time, that I would urge it strongly on the sportsman who has failed of finding his bevies on the feeding ground in the morning—if he *know* that there is a fair show of birds in the district—not to persist in wearing out himself and his dogs, by fruitless toil in the heat of noon, but rather to await the cool afternoon, when he will very often make up for lost time, and make a heavy bag when circumstances looked least auspiciously.

"I have now set my sportsman fairly in the field, and shown him how best he may find his birds,—more is beyond my means.

"A crack shot must in some sort be born; but most persons with good eyesight, and steady nerves, may attain to respectability, if not excellence, in this gentlemanlike and manly art.

"To this end, practice and coolness are the great desiderata. Rules, I think, avail little, if anything. I have seen men shoot excellently who closed one eye to take aim—excellently who shot with both open,—never, however, I must admit, decently, who *shut* both—not, by the way, a very uncommon occurrence with beginners. I have seen men again shoot excellently, carrying their guns at full cock—excellently, who never cocked either barrel till in the act of firing.

"There is, however, one thing to be observed,—no man can shoot well in covert, or at snap shots, who follows his bird with his gun, or dwells on his aim—the first sight is always the best; and it is *deliberate promptitude* in catching this first sight which alone constitutes—what my poor friend, J. Cypress, Junior, used to call the rarest work of nature—a truly cool, truly quick, *crack shot.*"

# CHAPTER IX.

## DUCK SHOOTING—THE MALLARD.

Of all the shooting that I know anything of, in this section, duck shooting, in favorable localities, affords by all odds the finest sport. The mallard, especially, is a game bird of the first order. He is strong and swift of pinion, and, when once alarmed, difficult of approach. Few birds carry off shot better than he; and the gun and the gunner that take him down, regularly and certainly whenever he gets up, within range, need both to be a little better than "middling." At the first of the season, perhaps, this duck will show himself quite unwary, and may be killed with ease in any of the ponds he frequents. But shoot about his resort a few times, and you will then have to deal with one of the most watchful and cunning rascals in the world. It will not happen once in an hundred times that you will see him as soon as he sees you. His keen vision descries you two or three hundred yards up the creek, as you crawl stealthily along, and if ever once before frightened by man, he will take wing on the instant. His sense of hearing is most wonderfully acute: break but a twig, however small, and at once he is upon his guard!

The mallard is common to all waters of the South. After the "first cold spell in November," our rivers and many of our creeks contain hundreds of the species. With them we most commonly find the beautiful wood duck, commonly known as the *striped head*. In the waters of the *Alabama*, very early or very late in the season,

a great many *green or blue-winged teal* accompany the mallard in his visits; the former appearing in the fall, the latter in the spring.

Most of our shooting in the interior is done on the numerous creeks into which the ducks go in large numbers from the rivers. Very cold weather, when high winds prevail, is sure to drive up thousands of them to the better-protected waters of the smaller streams. At first, as I have hinted above, they are apt to be anything but wild; first-rate opportunities are plentiful to get shots at large flocks—but presently they change their tactics entirely, and if they continue numerous, must be approached in the most artistic manner to get shots at all. As a general rule, however, on the streams they frequent they usually have favorite spots for feeding or disporting themselves, to which they quite regularly resort. It is important, then, to the hunter, to acquaint himself with these localities, and to *mark their approaches accurately*. For instance, here is quite a deep hole of eddy water just at this bend of the creek. At its lower end, a log crosses the stream, and on it the ducks frequently may be seen standing in a long row. There is but one—just one—way in which the hunter can escape their observant eyes. Before he has got within two hundred yards of his game, (as he goes down the creek,) he must take a circuit out from the stream—out far enough to prevent the possibility of his being seen. When arrived at a point exactly opposite the eddy water, he takes a "bee line" for it—taking care only to avoid noise; for the high bank on the side of the creek he is on, shuts him out from the view of the ducks completely. He is thus able, by careful threading of his way, to creep up on the unsuspecting flock, and put one barrel in on the water, and the other as they rise. Had he omitted the *detour*, he would almost inevitably have been brought by the winding of the creek into some posi-

tion whence he could be seen by the ducks, and would have obtained no shot. It is of the first consequence, then, in duck-shooting on creeks, *to know your ground accurately*. If you have a companion, too, who is also well informed as to the haunts of the birds, it is all the better. It is usual with ducks, disturbed on streams such as we indicate, to fly only one, two, or three hundred yards, from one favorite spot to another. This enables two persons to hunt them to great advantage. Thus A and B are points on the stream at which the ducks feed. You and your friend are hunting down the creek. You, before getting within ear-shot of A, make such a *detour* as I have described above, and by means of it *approach* B, within clear shot of which you lie *perdu*, awaiting the operations of your friend at A, which is, say, a couple of hundred yards above you. He steals upon the ducks at A, fires upon and rousts them, and they incontinently direct their flight down to B, where you await them. In the act of settling on the water, you give them one barrel, and as they rise in thick confusion, with a terrible flapping and quacking, you put in your second barrel with terrible effect. Your friend then slips around to the distant point D, and conceals himself, while you roust them from the intermediate point C, and drive them down to him. In this way two men will generally kill a great many ducks, if they are patient, light of foot, and know the ground accurately The last is the main point.

Shooting on the rivers is generally done by two parties, in as many canoes; whereof one keeps under the willows of one bank, and the other of the other bank. It is usual, I believe, to have two gunners—one in the bow and the other in the middle of the boat—and a paddle in each boat. Each canoe hugging the shore, (near which the ducks are generally found,) and proceeding *pari passu*, the ducks often afford shots to both parties.

Generally in these hunts, tents, etc., are taken along, and the hunters, going slowly and carefully along through the day, make it convenient to get out with their luggage, late in the afternoon, near some *roosting ponds*. Some of the party arrange the camp on the river bank, while others go to the ponds to shoot the ducks as they come into roost. There is no finer sport than this. However, like most good things, it does not last very long. The ducks come in between sundown and dark, and the more they have been shot at, the later they make it in going to roost. Other things being equal, it is much better for the sportsman to stand so as to face the west. The lingering rays, (the ducks being between him and the departed sun,) assist a great deal. If it is a good pond, and the hunter is full early at it, most probably as he is going off into a fit of abstraction, he is roused by a distant plaintive whistle—the note of the wood duck—and the next thing is a sharp whizzing overhead, and then a sudden plump of perhaps a dozen *striped heads* into the dark placid waters before him. Presently a far-off *quack* is heard, and in a moment a flock of mallard whizz by him. Crack! crack! at this end of the willowy pond; and as they rush on with cleaving wing, crack! crack! at the other end. These are the advance parties. Directly they come in thick and fast. Wood duck on this hand, mallard on that! Whistle and quack are heard on all sides; from all quarters they burst in—the air is thick with them, and the water in a continual splash. But it is growing darker every minute. There, opposite you, is an open space between the thick branches of the swamp trees. Keep your gaze on *that*—every now and then it is darkened with the rushing crowd. Pitch it into them, coolly. Load and reload calmly but quickly; and when it is too dark at length to shoot, why, perforce, you must desist. Your dog, if you have one, must be kept at work retrieving.

It is of no use to go to one of the ponds "in the morning" to recover your ducks. The minks will have left you nothing but a few feathers.

Immense numbers are killed in this way, by experienced hunters. Like every other thing, however, simple as it seems, a little experience is necessary to give one "the hang." The excitement to a beginner is very apt to be overwhelming. The ducks come in with a flight so rapid —from this side and that—the ring of their pinions and their cries make so mingled a din—their numbers are often so great—that the tyro cannot but be confused. This will soon wear off, though, and then the man who loveth our art is "in clover." With his rough retriever—half bull terrier and half setter, or perhaps with the blood of these and a dash of Newfoundland to give him more weight bone and endurance—he knows that so soon as the shooting is over, he can recover all his game from among the willows and flags of the pond. So he blazes away while Don remains quiet, half hid by an old log, with only his head half raised, and his eyes gleaming, as he recognises the sound of the wings of the approaching squadrons. He knows full well that *his time* will come directly.

## CHAPTER X.

### A WOODCOCK STORY—QUAIL.

It is rare in this region that we have a chance at Snipe and Woodcock; notwithstanding, season before last, myself and sporting friends managed to kill eighteen or twenty Woodcock (speaking of Woodcock, thereby hangs a tale), and quite a number of Snipe. Notwithstanding Snipe will sometimes afford fine sport, even in this region, I would advise you by all means to keep your pupil from their *baleful influence*. I never knew a young Pointer to hunt them without its doing him great harm. They will rarely lie well to the dog, consequently he soon becomes unsteady. None save an old and staunch dog should go after Snipe. Such has been my experience, as well as that of my sporting friends.

Speaking of Woodcock above, I mentioned that thereby hangs a tale. I must give it to you: You must know I have a female friend who is decidedly *fast* for her age. She is perfectly *au fait* upon anything appertaining to literature, music, science, and the *table*. She is decidedly epicurean in her tastes, and while suffering from the demon Dyspepsia, often has been the time I have been benefited by her *nice things*, &c. (God bless her! may her shadow never grow less!) You must know that a few months agone she paid a visit to the city of Gotham, where her epicurean taste was delighted with the game of the season, Woodcock among the rest. Frequent, earnest, and spicy were her dissertations upon the game birds of the North—Woodcock in particular. Well,

while out one evening with dog and gun, an unlucky bird, with a large black body and *very red* head chanced to pass within range of my gun. I fired, and redhead, vulgarly called Woodcock, was brought down. I proposed to my sporting friend that we should try and pass it upon Miss —— as the Simon-pure game bird. He acceding, when we returned, I hastened with a gleeful countenance to lay my prize before my fair friend, telling her that I had just killed a great favorite of hers—a *Woodcock*—and that she should prepare it for herself alone. She hearing its name—Woodcock!—(Oh, ye!) was perfectly delighted. Some one near, not so epicurean in taste, cried out, "Miss ——, you are not going to eat *that* are you?" "Isn't it Woodcock?" "Yes—but I wouldn't eat *that thing*." "Oh, you don't know what is good; it is a regular *game bird*—highly prized in New York."

Well, the upshot of the matter is this: the joke was carried farther than I intended. I purposed to have it nicely cooked, as only she could have it done, and have it brought upon the table, and then I would make an exposure. But it so happened that I was compelled to go into the country that night, and did not get back until 10 o'clock next day. I had forgotten all about the joke, but when I saw Miss ——'s countenance it recalled the idea I had of Tam O'Shanter's wife when she was "nursing her wrath to keep it warm." And didn't I catch it, hot and cold? "To treat me *so bad*," "I couldn't believe it of you." I asked an explanation——"That Woodcock! too bad, ugh!—oop-oo-oop, arr-e!—too bad." And when she looked up so thought I. The cream of the joke I missed by being absent from breakfast. She, with a sparing hand, proffered to help those at table. Only one would partake, and she couldn't *swallow* it. The epicurean lady ate it with a decided *gusto;*—rich, rare and spicy were

her plaudits of the game bird, the peculiar *game* flavor, &c. But enough; the joke was really carried farther than I intended, and I am sorry for it, as my fair friend cannot bear a game bird to this day.

Friend H., you requested me to give you my views in relation to the power of Quail to withhold scent. With myself for a long time it has been a fixed fact, as also with most of our amateur sportsmen. I see the fact mentioned by Herbert, Skinner, Lewis, *et al.* Each one speaks of it as being a voluntary act of the bird; and if not voluntary, that they are aware of their possessing the power. I believe neither: I look upon the fact not as *instinct*, nor anything out of the common laws of nature. I account for it altogether by supposing that excessive terror has checked the usual secretions or effluvia that, in a state of quietude, is given out by the bird, by which the dog is enabled to scent them. If you look in *Carpenter's Human Physiology*, you will find that sudden and excessive terror will immediately check the lacteal secretion, and this is not the only secretion that is checked by fright. Every one has heard of fright producing gray hairs. They say that they are conscious of the power or property, or they would not lie so close—allowing you almost to set foot upon them before moving. I think it is owing to their excessive fright. Terror in the first place checks their secretions, and in the next prevents flight, as they feel as secure in one place as another. See how readily fright will confound the fawn, the hare, and other timid animals, and some birds. I have even heard of birds being checked in their flight by the yelling of a large number of persons, underneath them;—the birds would drop almost as if shot. Every schoolboy is familiar with the practice of surrounding the hare and then setting up an unearthly yelling;—the hare in most instances will become so confounded that it may be picked up by hand.

It is the same fright that keeps the Quail under cover, although hunter and dog may be very near.

It may be possessed not only by one bird, but a whole bevy may possess the power or property. I will mention an instance : I had spotted several bevies near our village. With one I always had great difficulty—scarcely ever obtaining more than one or two shots. When I would flush the bevy, the birds would rise wildly and fly to all points of the compass. Their motto seemed to be, "Every one for himself, and the devil take the hindmost." I have never before or since seen so wild a bevy. Even when I had closely marked a single bird, I rarely obtained a shot. At the time to which I allude, my dog pointed them at their usual haunt, and to my utter surprise they rose well together, and settled in a beautiful cover for sport, at a short distance. My friend and myself marked them well and closely. Not knowing the Quail as I now do, we immediately pushed after them, anticipating fine sport. We beat the ground again and again—circled the spot to see if they had left—we made our dog hunt very closely, but not a feather could we raise. My dog did not evince by his action that a single bird was near. We beat around the spot at least half an hour, wondering what could the matter be, and rather disposed to blame the dog. (And by-the-by, friend H., let me whisper this fact—there is not a better nose in Alabama, for Quail, than Roscoe's.) Thinking that we or the dog (one) must be misled, we were about giving them up, when one rose directly under me, and then whirr, whirr, they went all around us —the dog in the very midst, and *he* did not point ! How can it be accounted for, unless the secretions were checked by fright ? To prove my views I will mention another case, wherein the same effect was produced by a fright from the hawk. Some sporting friends of mine were approaching a field when they saw a hawk soaring with a

Quail in its talons. They leisurely pursued their way through the field, where they were induced to rest a few moments—the dogs at the time at their heels. After resting for a short time, they were startled by the uprising of a bevy all around them and in their very midst. Now the effect of withholding scent was undoubtedly produced by the depredation of the hawk; it was of course not produced by the sportsmen and dogs, as they had not been flushed. If it was a voluntary act on their part it was altogether superfluous to hold it from the hawk, who obtains his prey alone by sight. When physiology tells us that fear will in many instances, even with *human* beings, check secretions, it is not difficult on my part to believe the same cause will produce similar effects upon the Quail.

# CHAPTER XI.

## PARTRIDGE SHOOTING.

I AM greatly indebted to my friend, Samuel Swan, editor of the *Southern Military Gazette*, for the use of the following spirited sporting articles, from the pen of the accomplished and versatile author of "*Field Sports*." Mr. Herbert's descriptions have never been excelled; no living literary artist equals him, in my opinion, in that sort of limning which is accomplished by a few dashing strokes. In "My First Day's Partridge Shooting," and "The Yorkshire Moors," he is fully himself. They were never in print before, having been written for Mr. Swan's Gazette, just as that periodical was discontinued by its proprietor in consequence of the large increase of his business, leaving him no leisure to attend to it. I present first:

### MY FIRST DAY'S PARTRIDGE SHOOTING.

At last I was eighteen years old. I had been in the sixth form at Eton more than six months; had been promoted from round jackets to long-tailed blue coats, the height and front of the Etonian's ambition; from a pony to a fifteen-hand thoroughbred hack—which I believed to be the best hunter in the island—and from my seat at my sister's governess's table to a knife and fork in the dining room; and now I was to be promoted from shooting rabbits, snipe, wild fowl, larks, and such other animals of the half-game order, to the dignity of a game certificate and a license to kill game in my own right throughout England.

I was already more than a fair shot, for it had been agreed between myself and the governor that I should be entitled to claim a game certificate so soon as I could kill nine out of the first twelve skylarks that should get up before me—the sky-lark when he does not rise to sing flying low, very swiftly, close to the ground, by no means unlike a snipe, and quite as difficult to kill.

This feat I had accomplished some three weeks before the first; my certificate was bought; my first shooting jacket built; my gun cleaned for the tenth time within the last two days; my shot-pouch and powder horn filled; and I, filled full from head to foot with anticipation of distinguishing myself before the eyes of the governor, went to bed, but not to sleep, on the night of the thirty-first of August.

I was awake and on foot at day-break, and it seemed hours, nay years to me, before my father made his appearance, rigged for the field, at about eight o'clock.

Well, to the field we went, in the home farm, and within five hundred yards of the house; in a fine turnip field, knee deep among the broad green leaves, the dogs came to a point. I had made some trivial wager with the governor that I would bag my first bird, a dog-whip or whistle, or some such trifle; but my heart was as much set to win as if a million had been at stake.

Three young birds rose, two crossed the governor to the right, and both fell to his two barrels killed clean. My bird fell, likewise, but he was wing-tipped only, ran and was not retrieved.

I had lost my wager, and my heart was heavy—the governor chaffed me and laughed at me—I grew nervous—got out of sorts—blazed right and left at everything. I carried both barrels at full cock then; everybody did so in those days—missing it before it got five yards away—was quizzed and laughed at more and more, and came

within an ace of being destroyed and rendered worthless as a shot forever.

Suddenly, in a desperate situation, I took a desperate resolve: I would never again, while I lived, cock a gun till the bird was on the wing at which I was about to fire. No sooner said than done. I let my gun down to the half-cock and proceeded. The next ten birds that rose I put up my gun to my shoulder without cocking it—pulled—no fire came, and I got quizzed more and more, and, at last, actually scolded, as if I were holding back my fire purposely, because I could not get what I considered a true aim.

Then I was lectured on the beauties of a *first sight*, and on the inutility of picking after my birds and on the danger of becoming a pottering shot; all of which I knew, every iota, as well as my monitor. But not a word deigned I in reply, either in defence or in explanation.

At last I got the hang of it. I cocked my gun as I raised it, discharged it as the butt struck my shoulder, and of course killed my bird. I killed thirteen birds, one after the other, in unbroken succession, four of them double shots. Then I missed one bird, killing its mate with my second barrel, and five more in succession; then two misses and eight kills, each after each.

At nightfall I had bagged twenty-seven birds out of twenty-nine shots, after missing some nineteen or twenty shots without a single kill in the morning. I have never done much better since. That morning made me all that I claim to be at this moment, a *deliberately* prompt shot. But you had better believe, gentle reader, that from that day forth, to this, I have never cocked my gun till I have seen my game fairly on wing or afoot; and yet more, till I have let it go, as far as I intend that it shall go at all; and I find that I can kill as many snap shots as most men. Let those who will, carry their guns cocked. I

say *let them*—so that they don't carry their hammers down on the nipples—it is all one to me. If they do so, they don't shoot in my company *nohow*; but for my own use, give me the gun at half-cock and *deliberate promptitude!*

## THE YORKSHIRE MOORS.

It is now well nigh thirty years since my first day on the Yorkshire moorlands. I was then some eighteen years of age, and in the sixth form at Eton. In the preceding autumn I had been promoted for the first time to a game certificate, and had waged war on the gray partridge, *perdia cinerea*, with such success as to kill my fifteen brace in one day's shooting, and to gain the repute of being a most promising young shot; for be it known I had practised first on hedge-sparrows, field-fares, skylarks and swallows, and afterward on English snipe, water fowl and moor hen, which are not included in the category of game or prohibited to the landless and unlicensed gunner, until I had acquired the trick of bringing my stock to my shoulder, my barrel on a level to the eye, and drawing my trigger-finger with a single motion, and that without either winking at the flash or shrinking from the recoil. In short, I was in a fair way to be as good as I was a keen shot, when few Eaton boys had a soul above a cricket-ball or a boat race.

But the moors! the moors! the glorious twelfth of August! *Hoc erat in votis!* This it was which was to constitute me a *bona fide* sportsman; to make me the pride and envy of my classmates—my classmates! nay, but of the country gentlemen, the crack shots, the brag artists of the south country preserves, to whom a well-stocked turnip-field or well-filled pheasant covert, was the noblest scene of their exploits with the gun.

How eager were my days, how sleepless my nights,

as that day of days approached, which was in my own esteem to raise me to the level of a Cæsar! and when the missive was despatched to ask permission of the eccentric but kind-hearted mistress of Fontague's abbaye and unnumbered acres of "heath and whin and bare wild moor," how did my heart leap to the sound of the post-man's horn! how did I strive to anticipate the future, and when the reply arrived in the affirmative, where was there to be found one so happy as I? My gun cleaned and re-cleaned, locks taken apart and put together again, oiled and wiped dry and oiled again, till every one in the house was, or at least had good cause to be, utterly a-weary.

And then my rig for the twelfth—methinks I can see it as it lay before me now, just from the hands of the most approved artist in St. James street—point device according to Gunter. The russet-purple shooting jacket of light velveteen, precisely the shade of the blooming heather; the dun-colored tweed waistcoat and trousers, undistinguishable from the tints of the faded grass and ling; the stout yet light and easy shoes; the leather ankle-gaiters; the purple-cloth shooting cap, with a tuft of heather and withered fern in the band—all fashioned alike to excite the jealousy of the rival sportsman and to defy the most fastidious eye, while it should at the same time pass before the eyes of the vigilant and fearful moorcock without awakening his observation—that all spectators should exclaim, "Capital get up indeed!" "Devilish well made, and in good taste too! not a bit overdone, like Aston's liveries there! no one can say that for them!"

At length the eve of the happy day arrived. The weather was in all respects propitious, and at daybreak on the eleventh we set forth, myself and the best and dearest of all earthly friends long since departed from this world of toil and trouble, in a light stanhope drawn

by an active horse, encumbered by no luggage beyond our gun-cases and the changes of raiment necessary for our trip.

Old Harry Lee, the sturdy veteran game-keeper, who taught "my young idea how to shoot," and to accompany whom on his rounds I have risen a hundred times from my bed at daybreak or earlier, when the sun rises at three in the morning, had set out two days previously, leading a stout Shetland poney laden with panniers, and taking with him four brace of as staunch and swift and beautiful dogs as ever dropped to shot, or stood staunch and still as death over a running bevy. There were Cynthia and Phebe, a pair of orange and white silky Irish setters, with large soft eyes and coal-black muzzles, feathered six inches deep on the legs and stern—Pierrot and Jason, two liver and white pointers, the former so lively a game-finder that the best shot with whom I ever pulled a trigger was used to say that he "half believed Pierrot could make his own game whenever he was at a loss"—Charon and Pluto, a brace of black and white Russians, fleeced like Arctic bears, and with such a fell of matted wool hanging over their short bullet heads and grim faces, and almost quenching the light of their quick keen fiery eyes, that it was difficult to conceive how they could see daylight. They were the best retrievers I have ever yet shot over; the staunchest, keenest, most indefatigable and indestructible of dogs.

Charon was for years my own especial dog; him I was allowed to take out of the kennel alone without a keeper to accompany me, when I was, or was supposed to be, too young, too ignorant, and too impetuous to be trusted with any dog that could be damaged. "*Even* Frank," it used to be said, "could not spoil Charon!" and I believe the D—l himself could not, had he tried it.

He had been imperfectly broke, and if birds were killed,

he would run in and fetch them; but even in his unsteadiness he was so staunch, and so unerring was his sagacity and instinct, that if a fresh bird lay in his route as he dashed in to fetch that which had fallen, he would invariably point it *dead*. I never knew him flush a single bird in his most impetuous rushes.

If a covey was missed clean, he would drop sulkily to charge; but he would invariably look round and stare in your face with a sort of sullen grunt, as who should say, "What do you mean by such work as that?" If you missed three times in succession, menace and coaxing were alike unavailing. Home went Charon, and for that day was no more seen.

More extraordinary yet, he could distinguish by the eye when a hare was wounded, when no man living would have suspected that the animal was hit; and whereas if one went away cleanly missed he would charge like a rock; the instant he perceived, how I cannot imagine, that it was carrying away a load, he would chase like a devil. But, as in the other instance, I never saw him chase a hare that he did not bring it home; and he could no more have run down a fresh one with a twenty yards start, than I could run down an elk on an open prairie.

The fourth brace were a pair of coal-black setters, Death and Dream, beautiful as night which they most resembled, without one white speck on their lustrous coats, perfectly broken, tractable as lambs, fleet as deer, yet full of fire and spirit, fearless and tireless, and less fleet only than the wind.

Such was the governor's kennel; and even as I never yet have seen such a shot or sportsman as he was, so never have I seen nor shall I see, so far as I expect, such a kennel of dogs, whether for staunchness, certainty, speed, or beauty.

All day long we travelled through scenes of the rarest beauty, by the castled crags of Knaresborough, frowning

over the bright dark waters of the Nid, up the lovely vale of which lay our course to the moorlands—by the old fortalice of Ripley, where the lady Ingolby of that day received Cromwell, when he visited her at the head of his ironsides, with pistols stuck in her apron string—by Hampsthwaite's rural homes, by Dacre pasture and the oak woods of Darley, across Pately bridge and up the brawling Nid unto the spot where Ram's ghyll pours his tributary torrent into the wider stream.

Here, after a homely supper, rashers of bacon, new-laid eggs, short bread and home-brewed ale, to which fatigue had earned us eager appetites, we turned into the coarse clean sheets redolent of the bloomy heather on which they had been bleached, and lulled by the ceaseless brawling of the mountain brook which foamed down its gorge close beneath the window, I, for one, sank asleep so soon as my head touched the pillow, and dreamed of moor-cocks until a light flashed before my eyes, a hand was laid heavily upon my shoulder, and the old game-keeper's voice aroused me from my soft slumber.

It was past three o'clock, and breakfast was ready in the parlor. The sun would be up before we could reach the moor, and the morning promised to be a fine one. I was on my feet in an instant, and my first day on the Yorkshire moors had begun—he who will, shall hereafter learn how it ended.

## THE YORKSHIRE MOORS—CONCLUDED.

At length the long-wished-for moment had arrived. The breakfast was duly honored, the panniers packed with luncheon, to return as we hoped, packed with moor-fowl, and slung on the Shetland pony, were despatched, together with two brace of dogs, the bitches Cynthia and Phebe, for the morning's work, and the Russians for the afternoon,

under the care of the guide, to meet us on the verge of the moors.

It was not yet light when we started from the door of the little Inn, to scale the four miles of steep and continuous ascent, which led by a road liker far to the gulley of a mountain torrent, than to any path made by the hands of man, from the level of the beautiful bright river to the summit of the misty plateau which forms the base of the moors, the loftier hills rising above it in huge, rounded or square-topped masses, divided from each other, sometimes by wide plains of the richest heather, sometimes by mossy bogs, whence steal the rills which, gradually swelling into burns, as the larger brooks are termed, pour down through the ghylls or gorges which they cut for themselves through the peat, the gravel, nay! even through the solid sandstone, and become the feeding tributaries of the lovely rivers of the West Riding

The first pale streaks of dawn stole up the east as we ascended, the clouds, few, fleecy, and far between, hung lightly here and there in the pure dark sky, from which all the stars had faded except Venus, who still showed her waning lamp near the horizon, for she was now the morning star. As we reached the summit, where two dark, indistinct shapes were awaiting us, of boy and pony, at the swing gate which gave access through the high dry stone wall, to the wild, bare moor, on which many of the smaller landholders of the ghylls and dales had right of pasturage for their black-faced sheep—*in futuro* the finest of mountain mutton—and black cattle in proportion to the number of acres in their respective holdings, though the lord or lady paramount of the manor only has the right of shooting, or deputizing persons to shoot over the range; the gray clouds changed their tints to amber, to rosy-red, to crimson, to flaming liquid gold, as the east gradually flushed brighter and brighter, until at length the great sun rushed up

like an orb of burnished gold, through the thin mist on the mountain heads, and, in an instant it was perfect day.

What a scene, what a panorama was there;—beneath and behind us the long retiring valley of the Nid, winding away in a far perspective of hanging woods, rich emerald pastures, crofts bordered with their shadowy sycamores, and village roofs and humble chapels peeping out between, until lost in the blue mists of distance.

Before us unnumbered leagues of barrenness and desolation, blue mountain beyond blue mountain, rolling away the vast earth billows of that moorland sea, without a spot of culture, an oasis of fertility, to the borders of Scotland, fifty leagues distance to the north-westward.

Around us knolls, hillocks, hummocks, hills, some round, some sugarloaf, some rock-ribbed and crag-crested; deep treacherous morasses tempting the foot of the unwary visitor by their exquisite smoothness, and the unrivalled richness of their emerald verdure; deep, abrupt, broken gorges and ravines, with clear brooks brawling along their bottoms, but all pathless, seemingly untrodden of man, cursed, one would say, with irredeemable barrenness, and inhabited only by the few titlarks which faintly hailed the rising sun with hymns, scarcely audible amid those vast solitudes, and the snipes and curlews which rose now and then, screaming dissonantly, from the bogs and peat-holes, whence the turf had been cut for fuel, for we had not as yet reached the choicer portion of the moor, haunted alike by the blackfaced quadrupeds, and the red-grouse allured ever to the same vicinity by the same succulent food on which their excellence depends—the young sprouts of the tenderest short heather, springing fresh from places over which the fire has run in the latest autumn of the past year. Nevertheless, with all the desolation, there was a sort of peculiar wild beauty, arising for the most

part from the singular and variegated hues of the surface; where the young heather was in bloom the whole superfices of hundreds and hundreds of acres was glowing with the most gorgeous hues of amythyst, garnet, and rubies; where the dry stalks and sere leaves of the later and older growth prevailed, all was deep tawney russet; where the fire had recently passed all was black as charred stumps and the very peat soil, scorched to the bottom, could make it—then again, there were patches of green furze with their golden blossoms, and tracts of dark green, rushy, rank grass, and gleams of the brightest emerald around the well-heads, and over all the treacherous morasses.

But now we had reached our opening ground, the boy with the pony and the second brace of dogs was ordered to the rear, with instructions to meet us by the side of a certain gray rock, and spring-head, on the northern edge of Kettletang, a huge, bluff-headed hill, overtopping all his neighbors, at noon, when we should be there to refresh the inner man, and take up the fresh dogs for the afternoon.

This arranged, to work we went. The ground was a long swell of gentle hillocks, facing the morning and sun, and sloping gently down to the south-eastward. It was covered with short purple heather, in full bloom, with here and there a patch of soft, green grass, and now and then a well-head, with a small silvery runnel oozing from it, and showing by the greener and lighter hues of the ling and grass around its course, how vivifying and beneficial were its influences.

It was precisely one of those ranges which the young broods love in the early morning, at the beginning of the season, and, in fact, the fleet bitches had not ranged five hundred yards, which they did at full speed, heads up and sterns down, crossing each other at every five hundred yards distance, turning unbidden, and quartering their

ground beautifully, before Cynthia came on her game so suddenly that she literally threw a somersault as she *set* the birds, turning herself completely over, so that her stern was toward the brood, and that she pointed them over her shoulder. Phebe backed her at a quarter of a mile, as steadily as if she had been cast in bronze or carved in marble.

"Steady now, Frank!" said the Governor—"They are close under her nose."

Gingerly, but firmly we advanced, finger-nail on the trigger-guard, thumb on the hammer, till we were within six paces of the bitch; she was trembling with intense anxiety, her eyes gleaming like coals of fire, her brows corrugated, the slaver on her lip.

"Careful, Frank, careful!" said the Governor, "I fancy it will prove a brood of squeakers, too young to kill—don't shoot the old hen, if it be so."

But at the instant, as he spoke, being to the right hand of me, the old cock rose clapping his wings in defiance, and uttering a loud crow crossed me to the leftward. He was a splendid fellow. He rose so close that the bare scarlet granulated spots about his eyes, and his angrily erected crest were clearly visible, as well as the golden and deep red hackles on his neck, and the beautifully pied plumage of his brown, red, and black-barred back and wing coverts, his breast was partly turned toward me, and it was black as night. He proved afterward to be a three year old bird, and weighed but a few ounces short of four pounds weight,—for I was steady, let him get fifteen yards away, then raised my gun deliberately, drew trigger as the butt touched my shoulder—a stream of feathers drifted down wind, and with a heavy thud the noble cock fell dead among the short flowery heather.

Nothing rose at the report, and it was not till after much kicking and beating of the heather, that the old hen

rose with seventeen squeakers, not bigger than six-weeks chickens.

Them, of course, we bade go their way rejoicing, as we did likewise, specially I—for had I not been cool, even by the Governor's *ipse dixit*, and killed my first heath-cock fairly?

Our next find was three old bachelors, as they are termed by the initiated, old cock birds, namely, which, not having paired or bred the last year, band together and become great pests to the breeders, beating off the young males, and disturbing the amorous couples.

They rose wild, at long-range—but we sent two snap shots after them, and two fell,—the Governor's killed dead, mine wingtipped, but the bitches retrieved him cleverly after a mile's roading. The third rise was a well grown brood of twelve, with their parents, which also got up shy and distant, the heather being as yet too wet with dew to allow their lying hard. Yet I knocked one over, my father killing two—the old cock, a prodigiously long shot, with his second barrel.

But as the day improved, and the sun grew warmer, the birds lay better, and I did my work creditably, to my own satisfaction, and won moderate praise from the Governor, and huge *kudos* from my preceptor in the noble art of *collineation*, as poor Cypress, Jr., was wont to call it, old Harry Lee.

When we counted heads at luncheon I was only two brace and a half behind my companion, who, as I said, was the best shot, walker and sportsman, it ever was my lot to meet, having bagged my thirteen brace and a half, six brace of them clever double shots, to his sixteen brace.

In the afternoon, with the fresh dogs, though I shot as well, or, considering the change in the weather and state of the game, perhaps better than before luncheon, I did not fare so well.

The day had become overcast, the wind had got up, the grouse had packed, and rose very wild and flew like hawks —still, when the sun set, and we knocked off work, I had shot eleven brace more, three golden plover, and a curlew —but the Governor, who always shot the best when the shooting was the hardest, had bagged seventeen brace more of grouse, a hare, and a brace of mallards, which sprung unexpectedly from a peat bog.

On the whole I had scored twenty-four and a half brace of moor-game, fifty-three head of game in all, against his thirty-three brace of grouse, and total of sixty-nine head —pretty well that for a green hand in his first season, shooting beside one of the best guns in the three kingdoms.

There were twenty-nine guns on the moor that morning, and the Governor beat the two best, with fourteen brace to spare.

Was not I a proud and a happy man that night, when after quaffing a half gallon of new milk, with a modicum of Jamaica in it—was too tired to eat supper—I plunged into the thyme-scented sheets, and was asleep before my head was well on the pillow.

# CHAPTER XII.

## TREATMENT OF THE DISTEMPER.

SINCE the foregoing pages of this little work were prepared, a friend has put us in possession of the following accurate description of the great enemy of the canine race—*the Distemper*. It was written years ago, by the great JENNER, and is, of course, an admirable description of the disease.

Every man has his own cure for the Distemper; the country is full of "infallible recipes." The chief point is to know whether or not the animal really has the disease. If that is *early* discovered, a mild purgative every other day, light diet, and a clean, comfortable kennel will probably cure him.

The following is the *Jenner* article:

### DISTEMPER IN DOGS.

That disease among dogs which has familiarly been called "the Distemper," has not hitherto, I believe, been much noticed by medical men. My situation in the country favoring my wishes to make some observations on this singular malady, I availed myself of it during several successive years, among a large number of fox hounds belonging to the Earl of Berkeley; and from observing how frequently it has been confounded with hydrophobia, I am induced to lay the result of my inquiries before the Medical and Chirurgical Society. It may be difficult, perhaps, precisely to ascertain the period of its first ap-

pearance in Britain. In this and the neighboring counties, I have not been able to trace it back much beyond the middle of the last century; but it has since spread universally. I knew a gentleman who, about forty-five years ago, destroyed the greater part of his hounds, from supposing them mad, when the distemper first broke out among them; so little was it then known by those most conversant with dogs. On the continent, I find it has been known for a much longer period. It is as contagious among dogs as the small-pox, measles, or scarlet fever among the human species; and the contagious miasmata, like those arising from the diseases just mentioned, retain their infectious properties a long time after separation from the distempered animal. Young hounds, for example, brought in a state of health into a kennel where others have gone through the distemper, seldom escape it. I have endeavored to destroy the contagion, by ordering every part of the kennel to be carefully washed with water, then white washed, and finally to be repeatedly fumigated with the vapor of marine acid; but without any good result.

The dogs generally sicken early in the second week after exposure to the contagion. It is more commonly a violent disease than otherwise, and cuts off, at least, one in the three that are attacked by it. It commences with inflammation of the substance of the lungs, and generally of the mucous membrane of the bronchiæ. The inflammation at the same time seizes on the membranes of the nostrils, and those lining the bones of the nose; particularly the nasal portion of the ethmoid bone. These membranes are often inflamed to such a degree, as to cause extravasation of blood, which I have observed coagulated on their surface. The breathing is short and quick, and the breath is often fetid. The teeth are covered with dark-looking mucus. There is frequently a vomiting of a

glary fluid. The dog commonly refuses food, but his thirst seems insatiable, and nothing seems to cheer him like the sight of water. The bowels, though generally constipated as the disease advances, are frequently affected with the diarrhœa at its commencement. The eyes are inflamed; and the sight is often obscured by mucus secreted from the eye-lids, or by opacity of the cornea. The brain is often affected as early as the second day after the attack. The animal becomes stupid, and his general habits are changed. In this state, if not prevented by loss of strength, he sometimes wanders from his home. He is frequently endeavoring to expel, by forcible expirations, the mucus from the trachea and fauces, with a peculiar rattling noise. His jaws are generally smeared with it, and it sometimes flows out in a frothy state, from his frequent champing. During the progress of the disease, especially in its advanced stages, he is disposed to bite and gnaw anything within his reach. He has sometimes epileptic fits, or quick succession of general, though slight convulsive spasms of the muscles.

If the dog survives, this affection of the muscles continues through life. He is often attacked with fits of a different description. He first staggers, then tumbles, rolls, cries as if whipped, and tears up the ground with his teeth and fore feet. He then lies down senseless and exhausted. On recovering he gets up, moves his tail, looks placid, comes to a whistle, and appears in every respect much better than before the attack. The eyes, during this paroxysm, look bright, and unless previously rendered dim by mucus, or opacity of the cornea, seem as if they were starting from the sockets. He becomes emaciated, and totters from feebleness in attempting to walk, or from a partial paralysis of the hind legs. In this state, he sometimes lingers on until the third or fourth week, and then either begins to show signs of returning health (which

seldom happens when the symptoms have continued with this degree of violence) or expires. During convalescence, he has sometimes, though rarely, profuse hæmorrhage from the nose. When the inflammation of the lungs is very severe, he frequently dies on the third day. I knew one instance of a dog's dying within twenty-four hours after the seizure, and in that short space of time the greater portion of the lungs was, from exudation, converted into a substance nearly as solid as the liver of a sound animal. In this case, the liver itself was considerably inflamed, and the eyes and flesh universally were tinged with yellow, though I did not observe anything obstructing the biliary du ts. In other instances, I have also observed the eyes looking yellow.

The above is a description of the disease in its severest form; but in this, as in the diseases of the human body, there is every gradation in its violence. There is also another affinity to some human diseases, viz., that the animal which has once gone through it, very rarely meets with a second attack. Fortunately, this distemper is not communicable to man. Neither the effluvia from the diseased dog, nor the bite, has proved in any instance infectious; but as it has often been confounded with canine madness, as I have before observed, it is to be wished that it were more generally understood; for those who are bitten by a dog in this state, are sometimes thrown into such perturbation, that hydrophobic symptoms have actually arisen from the workings of the imagination. Mr. John Hunter used to speak of a case somewhat of this description in his lectures.* Having never, to a certainty,

* A gentleman who received a severe bite from a dog, soon after fancied the animal was mad. He felt a horror at the sight of liquids, and was actually convulsed on attempting to swallow them. So uncontrollable were his prepossessions, that Mr. Hunter conceived that he would have died, had not the dog which inflicted the wound been

seen a dog with hydrophobia, I am of course unable to lay down a positive criterion for distinguishing between that disease and the distemper, in the precise way I could wish; but if the facts have been correctly stated, that in hydrophobia the eye of the dog has more than ordinary vivacity in it, and, as the term implies, he refuses to take water, and shudders even at the sight of it, while in the distemper he looks dull and stupid, is always seeking after water, and never satisfied with what he drinks, there can be no loss for a ready discriminating line between the two diseases.

March 21, 1809.

fortunately found and brought into his room in perfect health. This soon restored his mind to a state of tranquillity. Thesight of water no longer affected him, and he quickly recovered.

# CHAPTER XIII.

## NIPE SHOOTING IN FLORIDA.

### BY COR DE CHASSE.

As this little volume was getting ready for the press, the following interesting and graphic paper, on *Snipe Shooting in Florida*, reached me from that accomplished gentleman and crack shot, Col. Wm. T. Stockton, known to the readers of the *N. Y. Spirit of the Times* as "Cor de Chasse:"

"Quincy, Fla., January 26th, 1856.

"My Dear Hooper:—I am only at home a few days, and I am sure you will forgive me for my seeming neglect, when I tell you that I was absent from home for nearly three months, and had so much to say to wife and bairns on my return. But somewhat to my surprise, I *did* find your note requiring 'that article.' Since I have announced that it was from the veritable 'Jones,' I have become a man of more note. True, I was Intendant of the town, and Captain of the Quincy Light Horse, but the splendor of even those brilliant titles paled before the new one, of a correspondent of 'the author of Simon Suggs,' and 'Editor of Montgomery Mail.' But, really, your request is so flattering, you have the gift, as Pliny has it, (I'll quote him again shortly) '*adornare verbis, benefacta*,' that though little in the mood (though I have been much in the *mud* of late), I must make the effort—

I labor under the difficulty of not knowing what sort of an article you want, or to what use you wish to put it. If it don't suit, why fires are never far off this cold weather."

* * * * * * * *

"But I promised to tell you something of our Snipe shooting here in Florida, and if other kinds of sport become mingled with it, it is because, from the very nature of the shooting ground it follows as a consequence. I do not propose to give you a scientific dissertation on the bird in question, for Audubon, Wilson, Frank Forester, &c., have given us all that can be wished. I will simply sketch the proceedings of a friend and myself, during a couple of days in the beginning of December before last. P. and Cor have hunted the deer and worked their pointers together for some fifteen years. 'Cor,' said P., 'let us have our trip to Lake Jackson, and see if ducks and snipe are as numerous as heretofore; the cold weather, I am sure, has brought in the ducks, and in this bright sunshine the snipe will lie like quail.'

"'Agreed, we'll start to-morrow at dawn; the ponies will make a capital team on the road; we'll take saddles with us, and use them in going from camp to the shooting-ground and back. Sam will do the needful for the horses and the camp, for he has been with us so often, he has all the wrinkles from a venison steak up to a roasted snipe.'

"The next morning as the grey showed itself in the East, we were on the road. The hunting wagon was well arranged. The mess-chest supplied with all we could require (I am afraid to go into particulars since the 'Major' came out in 'the Spirit' with his tirade against demijohns), forming the seat of the driver Sam, who handled the gallant ponies, matched in action, though awfully diverse in color, as if to the 'manner born' while

Don and Donis 'charged' under our seat in the after part of the wagon."

"'Shall we reconsider the motion to 'camp' and go to the Governor's?' asked Cor. 'Oh! let's camp by all means; as we shall be so much in the mud and water, there will be less of restraint on us. True, the Governor will not forgive us, but my voice is for a camp at Shepard's old Sugar Mill; there we will find a roof to cover us, and it will be hard if the old timbers don't furnish us fuel.'"

"Two hours of time, and the quick moving ponies, placed us across Little River and the Ocklockonee, and the waters of Lake Jackson were before us. And, now, let me sketch this paradise of the snipe-shooter. It was originally some twelve miles in length, by from one to two in breadth, and its bright waters shone clear in the sunlight, from highland to highland, but in the *progress* of the age, whether from new subterranean outlets effected, which discharge the waters more rapidly, or from the greater evaporation, arising from the clearing up of its shores, certain it is, that with the exception of a few eccentric changes, its level has been lowering, and in localities where formerly we had capital trout-fishing in six feet water, at present large crops of the Indian corn are produced, subject of course to the accident of an occasional overflow, in which case, if the corn is ripened, instead of the wagon drawn by patient oxen, boats worked by 'darkies' in a hurry, become the medium of transportation of the crop to the crib. It is on these flats we seek the snipe; if a rise has taken place in the Lake, followed by a withdrawal of the waters, the tufts of grass among the corn form capital cover for the 'Scolopaces,' but in many places, when the land has not been brought into cultivation, a kind of marsh grass springs up, in which the game will lie to a dog as well as sportsmen can wish. But you must bear in mind that these same shooting-

grounds afford full feed to the Brent, Black duck, Mallard, Grey duck, Teal, *et id omne genus*. The highlands around the lake are crowned with handsome residences, and the youthful sportsman may almost hope that his skill is looked upon and admired by ladies fair, even should they fail to recognise him on account of the sepia tinge he may have acquired from a plunge into an alligator bed, or some similar "causa teterrima *belli*," anglice, going *almost* waist deep into a mud hole.

"The deserted sugar-house has been reached, the ponies rubbed down, and after a light feed, saddled for our use; full directions for the arrangements of the camp given, and Don and Donis, with wistful faces, are begging us to be off. Hardly had we gone fifty paces when several snipe rose wild, with the old familiar 'scape, scape.' Two of them doubled back, high in air, and though going down wind like bullets, were handsomely nailed by Cor and his friend, much to the astonishment of a passing countryman, whose wonder found vent in the words 'I tell *you!*' as the birds were carefully retrieved by the well trained dogs. 'Let's try the point next the Governor's.' We found it in just the right order. The grass was some six inches high, affording an excellent cover for our game, while the rich black loam, though affording sufficiently good footing for the sportsman, was all that the most difficult snipe could desire in the way of feeding-ground. You may imagine the prospect of our sport when I tell you, that on this point there were about fifty acres, almost identical in character, and we knew of sundry other similar places. Pity 'tis that we cannot dwell (as in deer-hunting, on the music of the pack, the turns and shifts of the game, as hill and valley echo with the cry) on the gallant action of the pointers—there is no time. They found almost at the same moment. 'You see to Donis, I'll go to Don.' Before I could reach my dog I saw

feathers floating on the wind, while the reports of P's barrels reached my ear, 'Scape,' and a snipe rose almost from under my feet, and was fairly missed from the unsportsmanlike flurry in which I fired. Still the good dog held his point. The load was quickly replaced. This time there was no hurry, and as three or four snipe rose within ten feet of Don's nose, two were easily cut down. For an hour the sport was fine—never did snipe lie so close; hardly could we walk them up—occasionally, the warning cry 'mark duck,' 'mark brent,' 'up lake' or 'down' would be given, and shooters and dogs crouch low, and reasonably close shots be obtained. In spite of number seven shot (light missles for heavy game) at intervals, a brent would come wizzing through the air with a broken wing, or a mallard strike the soft ground with a 'thud' right grateful to the ear. (Do not be critical on our number seven shot; we find them small enough for snipe, and they *will* kill a duck). But all this was the poetry of our work. Soon the snipe found the open too uncomfortable and took refuge in bushy thickets which skirted a portion of the lake, the shrubs rising to a height of from six to ten feet. Here there was no grass, and nothing but the excellence of our dogs enabled us to accomplish anything. The birds rose wild, and snap-shots were all the fashion, and at least one-half the time the dogs knew better than the men whether the bird was killed or missed. But without even the effort at a boast, well did the 'Mullin' in the hands of Cor, and the English gun in those of his friend, do their duty—of course, at intervals the sportsmen would meet and a few minutes halt be made to rest and compare notes. 'Do you see, across the lake, that little cove,' said Cor, 'where that fine live oak and the low pines shade the very bank? There, last winter, that party of our young friends made their first camp on the lake. As an old hand, I received a pressing invitation to

join them at some period of the week of their sojourn. On the morning after they reached camp, business called me within a few miles of them, I thought I would drop in and see what they had done. The party had just come in to lunch, and as they caught sight of me a shout was raised, and they advanced to meet me. Among them was 'the General.' "What sport?" "Pretty fair!" but I could remark an appearance of elation in them all, though most marked, perhaps, in "the General," and so quietly waited for the *dénouement*. A surprise for me was evidently preparing. The General's military step assumed a prouder air, as he strode beside my horse; a scientific wheel was accomplished around the tent, by which the game was suddenly made visible. "What do you think of that?" triumphantly asked the General. "By Jupiter, P," continued Cor, if they didn't have twenty-three Blue Peters laid out side by side, and not one single other bird! Commanding my countenance, I inquired "how it had been done?" "Oh! all military science! it *will* tell! I discovered the flock in the cove there, at daylight, arranged the hunters at once, an ambuscade was formed surrounding the cove, and at the signal, the whole battalion, I should say, partly fired; only three escaped! as we shall be here several days yet, and it will not do to risk their spoiling, what had we best do with them?' I could see that a misgiving was creeping over the whole of them which was fully confirmed by my reply, 'Hide them, as soon as possible, lest some sportsman should pass this way.' There were no more Blue Peters killed on that hunt—(The blue Peter, with its half-webbed feet, its chicken-like bill, its strong odor, and its absolute tameness, is always spared by the duck-shooter). 'But,' Cor went on, 'how splendidly our dogs have behaved. I always knew that Don was the best dog I ever hunted over, but I now believe Donis is the best I ever saw,' 'Donis understands you

evidently,' returned P., 'and is expressing his thanks, by that wag of his tail; we have sent the remnant of the snipe, for the most part, back to the open ground, let us have another turn at them and then we must change our shot for the evening flight of the ducks,' and well did man and dog and gun do their work. The sport was so good, the birds lay so well, the ground so open, that shooting fully in sight of each other, we did not *dare* to miss. There was no need to profit by the peculiarities of the game, as derived from Frank Forester's valued information. The shooting was better up wind than down, as it gave the dogs a better chance. Sunday visits had been paid to the game-bags, on the ponies, but our pockets were again becoming onerous. It was now sundown and we hurried to them once more, emptied pockets, and changed shot, Cor adopting No. 4, while P. preferred No. 6, and supported his judgment by saying 'we'll catch the mallard coming in to feed, and there will be few long shots.' We took stands on opposite sides of an arm of the Lak, about seventy-five yards wide, which expanded into a bay, filled with water-grasses, lily-pads, &c.—a portion of a field of corn had been submerged, also, offering great temptation to the green heads and their mates. By the time, we were safely ensconced in the tall grass, with the dogs couching near us, P. sang out 'mark ducks—lakewards!' and from that time forward, we had enough to keep us busy.

"Night closed in, but still the flashes of our guns at intervals lighted up the grassy waters, while the responsive 'plash' told that, even in that uncertain light, we were doing execution. 'Up rose the yellow moon,' and by her beams the shooting still went on. Of course, there were no long shots even attempted; but so unsuspiciously did the mallard come in, that the firing was well-sustained. In the long, coarse rushes, the saw-grass, the lily-pads, and the cold water, our thin-skinned pointers of course failed to

retrieve many of the birds; but when, after nearly two hours of the moonlight shooting, we gave it up, tired and chilled, the dogs shivering, and the guns foul, we each had as many as we could well carry to our horses. Securing our game to the saddles, we hurried to camp. Sam had managed admirably; a brilliant fire threw its broad glare over the ruins; by propping a shed, a safe shelter was provided for our horses; a quantity of fennel had been gathered, and with the blankets spread over it, an easy and fragrant bed was ready for us. But now 'spirits were called from the vasty deep'—(aye, and they came, too)—of the demijohn, much needed, believe me, after that night's exposure in the marsh, with the ice forming in the still pools. Wet clothes and boots were exchanged for dry, and things were more comfortable—*nunc edendum.* In the excitement of the sport, we had forgotten that breakfast had been had before day, and that nothing had been eaten in the interval. The ham and chicken were duly paraded, but Cor was bound to have some of the 'scapers' cooked *en papillote*, sundry stationery having been provided with a view to this important matter. Half a dozen snipe were duly plucked by Sam, while the exchange of wet clothes for dry was being made; and with all due deference to Frank Forester, a modicum of butter, salt, and pepper *was* placed within each before they were encased in the virgin-white costume, which duly encircled them before they were consigned to—ashes. The ten minutes were carefully noted, the plates judiciously heated, the toast anxiously waited, while the operation proceeded under the skilful ministry of Sam (a ministry about to become general, I trust.) Those ten minutes gave us time to count our game, for the spirit of rivalry still maintained. 'How many snipe, Cor?' 'Wait till I get through——sixty-eight.' 'You have beaten me; I have only fifty-six—but I expected it would be so. How about

ducks?' Cor counted out twenty-three ducks and three brent. It was now P.'s turn. 'Hold on! twenty-six, twenty-seven, twenty-eight, twenty-nine, and all told, and two brent.' 'That makes a grand total for the day, after the twenty miles' ride, of one hundred and twenty-four snipe, fifty-two ducks, and five brent! What a glorious show they make! We drink to Lake Jackson and the glorious sport we have had!' 'Snipe ready, sar,' reported Sam, as he placed the long-bills on the impromptu table. 'Delmonico' was nowhere; not an odor or aroma lost! Ye gods! did *you* ever eat snipe, cooked in camp *en papillote?* Never, I am sure, or ambrosia would not have been heard of! As we puffed the *post-cœnal* cigar, our conversation naturally turned on our game and its habits. 'You were not with the Doctor and myself last spring,' remarked Cor, 'when the snipe acted so singularly, on that piece of wet land in the Stephens' branch. I presume few sportsmen can say what we can. There are but very few I would even ask to believe me. We shot the English snipe, the veritable *scolopax wilsonii*, while sitting in tops of trees, an hundred feet in air! Think of that, Master Brooks. While out quail-shooting, we found about a dozen snipe in this place. They were wild as deer; nor dog nor sportsman could approach them. After flushing them once or twice, without getting a shot, away they all went, as if about to emigrate finally. Higher and higher they whirled in air, till the eye could scarcely follow them. This continued for some six or eight minutes, when back they came, apparently in as much of a hurry as when they left. Three or four came to the ground as usual; but imagine our surprise when we saw the rest lighting in the tops of tall trees. We waived all sporting rules, to be able to say that we had killed snipe thus.' The cigars were finished. 'One smile,' said P., 'for a night-cap, and then to bed; we must be out by day-break, to pick up the

ducks we lost to-night, or the hawks will be before us.' So we turned in, but not for long. P. had forgotten that two or three strong smiles, indulged in with an empty stomach, might result in something serious. A peculiar sound disturbed the quiet of the camp. It was evidently a throe (throw?) of nature. 'What's the matter?' 'Sick,' gasped P. 'What can be the cause?' 'Those d——d snipe!' Cor subsided among the blankets. All that sympathy *could* do was to control the risibles. And for a while he listened to the quack-qua-ack, quack, quack, of the mallard on the lake, and the cry of the brent as they passed overhead. Even the 'scape' of the snipe came sharply through the deep stillness of night. These sounds mingling with his dreams, made his night a restless one, for the triggers *would* creep, and the *hammers* would *not* fall. 'Turn out Cor,' (he was whistling the reveille) 'I have recovered from those *snipe*, and we must go and see about the ducks our dogs failed to retrieve. Let's have a cup of coffee and be off.' The dogs were fed with some warm corn-bread, to comfort them in the cold work to be done; and it *was* cold work, breaking the scale of ice on the grassy bay, as the sportsmen found it, for they had to take water freely to encourage the dogs.

"Right gallantly did the pointers perform service only fit for the rough-haired Newfoundland. Seventeen more ducks were recovered by them, though in some cases the hawks disputed the property, quite sharply. Back to camp, to breakfast, and the snipe served as before, were followed by no such dire results, as on the previous night. 'We have all the game we want,' suggested P. for ourselves and friends, to continue is murder; let's go home.' 'The sun has come out bright and warm,' interposed Cor, 'I think the trout will rise—I have with me, the Whitehall spinning squid, and if you will paddle me, I'll ensure a Catholic Friday dinner in Quincy.' 'All right,

there's a skiff at the landing, which, with a little bailing, will suit our purpose." "I done found a fishing pole" put in, Sam. Instead of using an hundred yards of line, as the inventor of the artificial bait contemplated, rod, we, owing to the grassy water of the lake, limited our aspirations to eighteen inches of a stout cord, which secured to the end of the rod, enabled us to play the glancing bait, in front of the boat—at first, the fates were unpropitious, but as the sun grew warmer, a change came over the waters—a rush, a flash, and a three pound trout lay in the bottom of the skiff, and now the sport became most exciting. Sometimes the rush was made from the depths below, and all the previous notice given was the dash so vigorously made, that the pearly drops fell in board; at others, as some cunning old fellow, hidden near the surface, under a lily-pad, and anxious for his breakfast, dashed to secure the illusive bait (he found it, not "vox" but "hooks et praetérea nihil,") the water would swell for a length of perhaps twenty feet. Talk of your Salmon-fishing at the rate of one a day! one hour of that incessant rush, dash, flash, splash, was worth an age of fly-whipping. The weights ran from one to eight or ten pounds. (Please induce some icthyologist to tell us the true name of this fish. I will furnish drawings and *count the fins* and *fin-spines*, for any one who will enlighten us. Black perch, I call them, when playing scientific.) "And now for a full count of the results," said P. "One hundred and twenty-four snipe, sixty-nine ducks, five brent and twenty-eight trout which will weigh over one hundred pounds! when this sport is exceeded, "may we be there to see!" Sam, put to the ponies—while we smile once more to the paradise of the snipe shooter, Lake Jackson."

January 26, 1856. COR DE CHASSE.

# NEW PROCESS

FOR THE

# CULTURE OF THE VINE

BY

PERSOZ,

PROFESSOR TO THE FACULTY OF SCIENCES OF STRASBOURG; DIRECTING PROFESSOR OF THE SCHOOL OF PHARMACY OF THE SAME CITY

TRANSLATED BY

J. O'C. BARCLAY,

SURGEON U. S. N

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# DEDICATORY.

TO NICHOLAS LONGWORTH, Esq.,

Whose intelligent efforts and great perseverance have done so much toward establishing, upon a firm basis, the culture of the vine, and the art of winemaking in the United States, is dedicated this version of Professor Persoz's monograph upon the Culture of the Vine. In making this offering to one, who is known wherever on the hillsides of the clear Ohio the vine gladdens the vintager, the translator feels assured that, through him, it will speedily reach the hands for which it is principally intended—the hands of the practical cultivator. Guided by the admirable instruction therein contained—offspring of science and experiment—the rural population of our Middle States, invoking Ceres and Bacchus, may plant the alleys of their smiling vineyards with the golden corn, and in due season gather in the double reward of their toil.

Many a rock on which now the wild rose scarcely finds sufficiency of nutriment, may, under the hand of him who, unblessed with hoarded capital, still rejoices in the capital of thews and sinews, start into luxuriant vegetation; and thus plots of barren mountain side, attainable even by indigence, may prove sources of support, perhaps of ease, to many who now subsist upon the wages paid by an employer.

In dedicating this work to you, the translator in some measure makes you responsible for its circulation, and should this circulation, in any degree, advance the knowledge of the culture of the vine, in which, with yourself, he feels a deep interest, he will deem himself fully remunerated for the labor and expense of the undertaking.

## TRANSLATOR'S PREFACE.

The subject treated of in the following pages is one which has taken a strong hold upon the mind of the American public, and as the interest manifested in it has grown with the rapidity which characterizes every undertaking in which the genius of our people embarks, we have thought that the labor of a few hours could not be better bestowed than in bringing before our agricultural masses the philosophical system proposed and pursued by Prof. Persoz.

This system, suggested by the laws of agricultural chemistry to an intelligent mind, has been boldly carried on in consonance with those laws, and, illustrated by happy experiment, has resulted in a method, admirable for its clearness, neatness, and economy of labor and space. The cultivator of the vine, no longer groping in the dark, no longer trusting to traditionary and empirical usages, may now begin with a rea-

sonable prospect of witnessing a successful issue to his toil. Unembarrassed by peculiarities of soil, almost indifferent, indeed, whether there be soil, he plants the precious wine-giving shrub in an artificial bed, containing all the elements necessary to the growth of the woody fibre, through which are to be elaborated the juices of the fruit; and having witnessed this growth advancing with a celerity not generally exhibited by nature in the temperate zones, curiously watches for the moment when its full development points out that the energies of the roots (one office being fulfilled), may advantageously be diverted from the fabrication of cellulose to the crowning effort—fructification. The rich compost which has covered his trellises with branch, tendril, and leaf, is now superseded by another, equally efficacious in its line, and, instead of beholding the shooting forth of a luxuriant growth of wood, doomed to be severed by the pruner's knife, he sees the swelling clusters of the grape, bending the parent stem with their luscious burden.

By this new method more than half of the

labor ordinarily devoted to the culture of the vine is rendered unnecessary, and at least one-half of the soil may be tilled and appropriated to the production of culinary or other vegetables, or even to some of the cereals, no injury thereby resulting to the vine.

The experiments of Prof. Persoz having been conducted upon no very extended scale, afforded him no opportunity of testing the vinous quality of the grape; but since the very elements indicated by nature, are offered to the plant, and are assimilated by it, there should be no reasonable doubt that the excellence of the fruit for vinification will prove to correspond with the healthfulness of the vine. Rich manures, as is well known, have always been avoided by the wise cultivator, whose desire is to produce a full-flavored, saccharine grape; and in certain localities of France, the municipal authority has interfered to prevent the use of such gross stimulants, which, while they produce abundant wood and large crops of fruit, impart something of their rankness to the juice.

In Prof. Persoz's method of culture, none of

the grossness of the initial manures can be communicated to the grape ; for it is not until these manures have fulfilled their office that the plant is called upon for fructification, and the stimulants then applied are inodorous and destitute of sapidity. Such being the case, no adventitious and offensive flavor will, in all probability, be associated with the juices of the fruit, and we may safely calculate on obtaining just such a crop as the particular vine selected would give, under the most favorable circumstances of soil and culture. The temperature and exposure (upon which temperature in part depends), have much to do with the perfecting of the fruit, and these should be carefully studied. Drainage and irrigation are rendered so easy by this method, that this alone would induce many to follow the system of trenching here laid down.

In conclusion, we would remark that nowhere, as in this work, have we seen the culture of the vine set forth in terms so clear, and so utterly free from empirical notions ; and we cannot but wish that every one whose revenue

depends upon the result of the vintage, may carefully study and faithfully pursue the excel lent advice here offered.

JNO. O'C. BARCLAY,

Surgeon, U. S. Navy, Philadelphia.

# PREFACE.

The new method of culture which we propose—permitting, for the production of alimentary plants, the utilization of half of the soil devoted to the culture of the vine—may seem, at first, completely to deviate from the divers modes, brought into use in our times, in the various viticultural regions. In order, however, to allay the fears of cultivators, we lose no time in stating that this is not the case. In fact, we do not pretend, either to offer a new system of pruning—since that which we propose has received the sanction of a long experience—or of giving as novel the development of our vines on trellises—though the form of that which we present offers some peculiarities—since in Italy, in the south of France, in certain of the Rhenish provinces, methods are followed which, in a greater or less degree, approximate to the

regular disposition which we describe ; or of modifying the manner of removing buds and of tying the vine.

That by which our process is distinguished from all others, consists in this : that we collect all the vine stocks of a certain superficies of soil in a single trench, in which, by an initial chemical action, we stimulate, in the first place, the growth of the wood, and then, by a second action, the development of the fruit. We have arrived at this result by establishing, through direct experiment, that in the manures adapted to the culture of the vine, there are materials, some of which serve exclusively for the increase of the cellular tissue, that is to say of the wood, others for the development of the germ—fruit or grape—and that the action of these substances, instead of being simultaneous, should be successive. By the application of these principles, we arrest at will the growth of the wood, which, in the ordinary processes, is regulated only after artificial and empirical means.

# EXPLANATION OF PLATES.

## PLATE I.

FIGURE I.—Elevation of a trellis seen in a longitudinal direction.

*a a'*—earth line,

*a b c d*—first trench or ditch.

*a' b' c' d'*—second trench or ditch.

*E P R*—*E' P' R'*—*E'' P'' R''*—Posts two yards and six inches in length, by two and three-fourths to four inches of a side, buried one yard and three inches in the earth; on these posts are stretched the iron wires.

*L S*—Slats of two and three fourths to four inches in width by one inch in thickness, pierced with holes at intervals, for the passage of *osier ties*, 1 1 1, destined to fix the canes of the lower stage of the trellis. These slats are supported, viz., at their extremities by the aid of small pegs or brackets attached to the posts *E P R* at their middle, by means of the stakes *o g*.

*o g*—Stakes two feet four inches in length by two inches of a side, buried fourteen inches in the earth and sustaining the slats *L S*, which are fastened by a nail—*m t*—*n u*, iron wires stretched on eaeh side of the posts.

1 1 1—Osier ties serving to attach the vines to the slats *L S*, of the first stage, and to the iron wires *m t* of the second.

3 3 3—Straw ties, by aid of which the young shoots are fastened to the wires of the second and third stages.

*k* $k'$—Reserved vine stocks.

*J* $J'$ $J''$—Props or Supports.

*F G H I*—$F'$ $G'$ $H'$ $I'$—$F''$ $G''$ $H''$ $I''$—Vine stocks laid down in the trench.

FIGURE 2.—Plan of three trellises.

*z* $z'$—Soil susceptible of being devoted to the culture of alimentary plants.

FIGURE 3.—Commencement of trellis with side view of a post.

FIGURE 4.—Cross section of trellis on a larger scale.

## PLATE II.

FIGURE 1.—Wood of first year's growth.

FIGURE 2.—Second year with *first pruning*, *a b*; *c d*; *e f*.

## PLATE III.

FIGURE 3.—Third year with *second pruning*, $a'$ $b'$; $a''$ $b''$; $c'$ $d'$; $c''$ $d''$; $e'$ $f'$; $e''$ $f''$.

FIGURE 4.—Fourth year with *third pruning*, $a''$ $b''$; $a'''$ $b'''$; $c''$ $d''$; $c'''$ $d'''$; $e''$ $f''$; $e'''$ $f'''$.

# NEW PROCESS

FOR THE

# Cultivation of the Vine.

# CULTURE OF THE VINE.

## THEORETICAL PART.

WHILE giving attention to some ornamental plants, we were led, several years ago, to the employment of preparations or artificial manures, destined to multiply the number of the flowers, and to augment the brilliancy of their tints: the results then attained, suggested to us the idea of undertaking essays in a more utilitarian view, in other words, for the promotion of agriculture.

It was with the vine that we exclusively occupied ourselves; first, because the small plot of ground which we had at our disposition did not permit us to try the same experiments upon other plants; in the second place, because, initiated from childhood into this particular culture, we were better able to examine into it, and to compare issues. In 1846 we made known to the Academy the results to which we had been led by the parallel culture of two vine stocks, of

which one had been treated with phosphates, the other abandoned to itself. The first, which showed an extremely vigorous vegetation—we gave at the time the measures of the shoots, in diameter and length—was loaded with grapes; the other, on the contrary, was without fruit. Since that time the stock subjected to the influence of the phosphates, has never failed annually to be covered with grapes; all the fruit-bearing branches or shoots of the year, the largest of which did not exceed in length and thickness the dimensions of a swan's quill, and the middling sized ones those of a goose quill, have always borne, at the least, two bunches, often five, commonly three, and all the fruit would bear comparison with the best Chasselas.

Finally, to complete this first experiment, during the last spring we subjected a normal stock, which, never having received artificial manuring, had never presented more than a few bunches, to the same treatment with that to which it served as a term of comparison, and it was, this autumn, covered with fruit to such an extent as to excite the astonishment, not only of those who have followed our comparative experiments, but also of those who were called upon to judge of it for the first time.

The principle which directed us at the commencement of our researches, is very simple. No wine exists which does not contain tartar, or what the chemist denominates bitartrate of potassa: if then the plant is required to form tartaric acid, it is indispensable that it should be furnished with the potassa necessary. Now, to give to the vine the potassa of which it stands in need, the potassic salt must be chosen in such a state that the roots may assimilate it without inconvenience to the plant; and, moreover, the epoch at which it is proper to offer it to them must be determined. After having, in the aforementioned note, signified the state in which the salt of potassa should be administered, we had still to determine what influence would be exerted on vegetation by the ammoniacal salts, or by the nitrates, and to indicate the moment when it would be proper to cause the potassic salt to act. To this end we devoted ourselves to numerous experiments, which were facilitated by the obliging kindness of Mr. Michelle, formerly rector, who placed at our disposition a portion of the garden at the Academy, of which he enjoyed the use.

To discover the veritable agents in vegetation, we caused the germination and vegetation of maize, com-

mon beans, peas, barley, spring wheat, kidney-beans, and two species of cabbage, in twenty-six different media; but, in opposition to that which has generally been done, up to the present time, instead of taking any soil at hazard, as the starting point of our experiments, which always leaves some uncertainty hovering over the direct or indirect part played by the substance tried, we adopted, as the basis of our operations, pure silica—the white sand of the glass blowers—and in pots of the capacity of about three quarts, some of them filled with pure sand, others with sand, to which was added, either pure phosphate of lime—this same phosphate mingled with carbon or other organic matter—or silicate of potassa, pure or mixed with phosphate of lime, all the phenomena of vegetation were accomplished; the circumstances were in other respects the same, since these vessels had the same exposure, and were irrigated with water, the nature of which was known to us.

From these various experiments, the details of which will be published in proper time and place, has resulted the proof that for all the aforementioned plants, the kidney bean excepted, the phosphate of lime, and the silicate of potassa—soluble glass—are

the eminently active agents of vegetation. No comparison can be drawn between the products, not only of the pure sand, but likewise of this sand mingled with substances, until now marked as exercising the most efficacious action upon vegetation—the ammoniacal salts, the nitrates of potassa and soda—and those of this sand mixed with phosphates. To give an idea of it, it will be sufficient for us to say that the maize, which languished and did not come into ear in the pure sand, vegetated on the contrary, and fructified in this same sand, mixed with phosphate of lime, and still better in this sand, to which had been added either bone black or phosphate of lime, silicate of potassa, and a certain quantity of organic matter. The peas furnished results quite as palpable. Their vegetation, which was feeble and imperfect in the pure sand, and in the same sand to which was added a certain quantity of nitrates, or of ammoniacal salts, was on the other hand vigorous in sand to which was added phosphate of lime, pure or mingled with carbon; in this the plant flourished and produced seed.

The action of the phosphates was particularly remarkable on the gramineæ, when they were accompanied by silicate of potassa. With the kidney bean

these differences which we have just set forth did not take place, as has already been established by Mr. Boussingault; the vegetation of this legume is nearly as vigorous in pure sand as in sand to which any substance whatever has been added; it is therefore an alimentary plant which may be cultivated without great exhaustion of the soil. To recapitulate, it seems to us established that the most indispensable agents to vegetation are the phosphates, the carbonate of lime, and silicate of potassa. This conclusion, at first sight, seems not to agree with that which various experimenters, and we ourselves, have already published.

Some chemists, in fact, have advanced that the ammoniacal salts are the most powerful agents in vegetation; others have attributed a still greater power to the nitrates, through their transformation, in determinate circumstances, into ammoniacal salt. But if the action of these bodies is incontestable in certain cases, it has not been demonstrated that it always takes place. Too frequently there has been an omission in noting the effect of such or such an agent, and particularly in ascertaining whether it should be attributed to a *direct* or *indirect* action. Because under a variety of circumstances the ammoniacal salts have produced

remarkable effects (and in relation to this the numerous and important publications of Mr. Schattenmann may be consulted), without other demonstrative proof than elementary analysis, the principle has been laid down that ammonia acts directly on the plant by the nitrogen which it furnishes to it; but if such were the case, the ammoniacal salts would everywhere produce identical and incontestable effects. Now, if it is otherwise, it is more probable that the action of these salts is only indirect. We will endeavor to elucidate the reason of this.

Whichever ammoniacal salt, muriate, sulphate, or acetate, we pour at the foot of a plant, we remark, after a few days, on the surface of the soil, and on the very spot which has been watered, a white crust, presenting all the physical and chemical characters of chalk—carbonate of lime.

If chalk is found to be of the number of products of the action of an ammoniacal salt upon the vegetable soil, the ammonia must momentarily have been in the state of a carbonate; but to recognize even the momentary formation of this carbonate is to admit a secondary and *consecutive* reaction, for we know that the carbonate of ammonia cannot be in contact with

the salts of potassa or soda — sulphates, muriates, nitrates—without decomposing them, and giving birth to an ammoniacal salt, and to a corresponding quantity of carbonate of potassa or of soda.* And who would doubt the energy of these last, either in agriculture—now that we know the efficacy of ashes employed in reasonable quantity—or in theory, since the labors of Dulong have unveiled the potent action of the alkaline carbonates on the insoluble salts?

This formation of alkaline carbonates being admitted, we can conceive that phosphates, insoluble silicates, now absorbable by plants, may be disaggregated by these carbonates, and rendered soluble, either directly or indirectly, by carbonic acid, or by the organic acids developed during the decomposition of animal or vegetable matter, and may become fitted to enter into the stream of the circulation. Thus, in admitting the efficacy of the ammoniacal salts, we explain it in a totally different manner; and, instead of proscribing, as has been done, the carbonate of ammonia, and furnishing the plant with non-volatile ammoniacal salts—sulphate and muriate—we admit the momentary for-

* Soda has been manufactured on a large scale by this process.

mation of this carbonate, and deduce from it the remarkable effects which observation establishes.

Certain facts also present themselves to give value to this reasoning. Mr. Boussingault, who, on his farm, has several times endeavored to establish the action of the ammoniacal salts upon the cereals, has never arrived at very favorable results in the employment of these two salts. The manner in which we view the action of these ammoniacal salts may explain the fact: the waters of Pechelbronn being rich in phosphates, the soil should be so likewise, and, consequently, as the plants there naturally meet with the quantity of phosphates of which they stand in need, the ammoniacal salts are without appreciable effect upon them. As for the nitrates of potassa and soda, if it is incontestable that they are transformed into ammonia by the action which organic matter exercises upon them, it is not the less so that their base passes into the state of a carbonate. They should, then, exercise a doubly energetic action, first, by the indirect effect of the carbonate ammonia, which excites the formation of the carbonate of soda or carbonate of potassa, then by the direct effect of the carbonate which comes from their base.

Thus, then, compelled by our experiments to contest the direct action of the ammoniacal salts, and of the nitrates which has been so much vaunted, we admit their indirect action in certain soils.

In examining the structure of organized beings, we soon find that their tissue is nothing more than an agglomeration of cells of complex nature; for it is incontestable that parallel with the organic cell there is formed an inorganic one which serves for the consolidation of the former. If any doubt could exist as to this, one need only have recourse to experiments, and subject to incineration a leaf, a vine twig, a bone, etc. The organic matter having disappeared, the exact image of the organ remains. Now, we should not be astonished at finding among the number of the constituent principles of these ashes, carbonate and phosphate of lime; for besides the property which these saline compounds enjoy of being able to enter into solution in water, by the help of the weakest acids, and of thus becoming transportable by the sap of vegetables, and the blood of animals, through the most delicate vessels to every part of the organs, there to become insoluble by the intervention of a base; they further offer the quite special character of not being

subjected to *the ordinary laws of displacement* which the other saline compounds experience. Thus, if we treat a sulphate—soluble or insoluble—with a powerful base, this base appropriates the sulphuric acid, and sets the oxide at liberty. Now a similar salt could not participate in the formation of the osseous system of animals, since the base which would contribute to precipitate it, would effect its complete decomposition, and would thus disorganize the cell. On the contrary, with the phosphates and carbonates, the former particularly, the most powerful base never completely removing from a phosphate its phosphoric acid, its action is always limited to the formation of an *insoluble basic phosphate*, and this is precisely the reason why the phosphate of lime has so large a share in the formation of bone. Rendered soluble by carbonic acid, and by the acids of the digestive apparatus, it dissolves, enters into the stream of the circulation, then by the influence of the alkaline secretions, it returns to the state of an insoluble basic compound, indecomposable, while the functions are in a normal condition. If the carbonate of lime is susceptible of being dissolved, and of being precipitated afresh under the same conditions with the phosphates, we will not be wrong in saying

that its stability, or the resistance which it opposes, is due to another cause. The carbonates are subjected to the ordinary laws of displacement, but as the carbonate of lime is not decomposed, except by the most concentrated caustic alkalies, the result is, that once lodged in a cell, it cannot be removed from it by the feeble base which provoked its deposit.

Besides the part which they may take in the formation of cells, these two compounds have still other offices to perform, which are to saturate the acids which are developed during the vital functions of beings, and to excite by their presence modifications in the spontaneous decompositions which are observed.

If by reason of the facility with which the phosphate and carbonate of lime become soluble and capable of circulating in the vessels, to be there afterward rendered in some sort indefinitely insoluble, we have been able to comprehend without difficulty all the importance of the functions of these two agents, we must avow that it has been difficult for us to account for the part played by the *silica* which is found in such large quantity in certain plants. Nothing is more simple than to represent to one's-self silica in solution; feldspathic formations are incessantly broken down,

effloresce and are decomposed to give rise on the one hand to *clays*, on the other to silicates with a base of potassa or soda, which remain in solution. Here then is this material in the state in which it is susceptible of being transported by water in the vessels of organized beings; but how is it there set at liberty? Up to the present time chemists have accorded to acids alone the power of decomposing the silicates; but to admit such a principle is to reduce one's-self at the same time to the impossibility of explaining the liberation of silica, and to consecrate the most enormous of contradictions. The phosphate of bones has evidently been deposited under the influence of an alkali; since it is a salt with an excess of base. That which is found in the framework of vegetables is deposited there under the same conditions, with this sole difference, that most frequently the deposit is determined by a slow and secondary action of the carbonate of lime. If then, in one and the other case, we cannot conceive of the deposit, except by the intervention of a basic body, how can we explain the part which the silica plays, concurrently with the phosphate and carbonate of lime, in the formation of cells? We have been fortunate enough to find for this problem a solu-

tion, which is also the solution of a long-mooted important question, viz., what part does sea-salt perform in agriculture.

What influence does this salt exercise in agriculture, or what is its action upon vegetation? This is a question which has long been under debate, and one of which the solution is still looked for. There is no doubt that in presence of carbonate of ammonia, sea-salt is able to furnish carbonate of soda; we may therefore, from this point of view, already represent it to ourselves as the *source* of a powerful alkali; but this action is but secondary in connection with the mysterious and important part which we have recognized in it. Sea-salt, in fact, in opposition to all theoretical calculation, is no sooner brought into contact with silicate of potassa—soluble glass of Fuchs—than the silica is displaced; if, however, this displacement occurs in presence of a large quantity of water, the silica remains in solution, and by spontaneous evaporation appears in the state of a transparent jelly; if, on the contrary, it is effected in presence of a large quantity of salt, the silica is precipitated in a pulverulent and opaque form, possessing all the characters of those deposits which are often met with in the neighborhood

of banks of saliferous formations. Thus is explained the efficacious and direct action which sea-salt, employed in proper proportion, always exercises in the culture of plants which require silica for the formation of their framework—(the gramineæ, for example).

Now that we have, as we think, demonstrated in an incontestable manner the efficacy of the phosphates, carbonates, and silicates, and have through the peculiar properties enjoyed by them, given a sufficient explanation of the part played by these bodies, let us return to our subject.

Our first essays were directed, as we have said, to subjects of a vigorous vegetation. The vine stocks of the experiment having already been developed to a certain point, the potassic salts, for that very reason, exercised upon them a less energetic action; moreover, these salts not being very soluble, reached the roots of the plants too tardily to permit us to appreciate their entire action.

On repeating the same experiments upon young vine stocks, and employing a stronger dose of the potassic salt, we observed, without astonishment, that the vegetation, far from taking on a more rapid development, lost, on the contrary, so much of its energy

that the subjects became stunted. The excess of the potassic salts here exercised the action of sea-salt upon those plants which vegetate accidentally in saliferous soils! It is known that the development of such plants is so reduced, that some botanists have made distinct species of them. While reflecting upon these effects, we were struck with the idea of dividing the culture of the vine into two parts; of seeking first to give to the wood, as well by particular care as by the intervention of the phosphate of lime, all the development of which it is susceptible, then to act solely with a view to determine the fructification. Thus have we arrived at the plan of substituting for the ordinary culture of the vine, which we may call *the natural culture*, a culture which is *completely artificial.*

To obtain all the possible development of the wood, we set various vine stocks in trenches, at the bottom of which we had introduced about one kilogramme per square metre* of a compost formed,

1. Of coarsely pulverized bones (bone dust of commerce).

2. Of clippings of leather or fragments of horn.

* Two pounds, avoirdupois, to the square yard, constitute the same proportion as that of the text.—*Translator.*

We covered the whole of this with good stable manure, mingled with earth. Three vine shoots, *a b c*, treated after this manner in the month of March, 1847, furnished us, viz.:

*a*. Isabella Vine, of Virginia, one cane 23 feet 10 inches long, and $\frac{78}{100}$ inch in diameter.

*b*. White Chasselas, two canes, { One of 19 feet 6 inches long, / the other of 18 feet 1 $\frac{7}{10}$ inch long, } $\frac{51}{100}$ inch diameter.

*c*. Rosy Chasselas, two canes, { One of 14 feet 6 inches long, / the other of 14 feet 2 inches long, } $\frac{63}{100}$ inch diameter.

In the spring of this year, three young rooted vines, *d e f*, subjected to a similar treatment, gave us, viz.:

*d*. White Muscat, one cane of 21 feet 7 $\frac{8}{10}$ inches long, } $\frac{43}{100}$ inch
*e*. Gray Tokay, one cane of 21 feet 11 $\frac{78}{100}$ inches long, } diameter.

*f*. Gray Muscat, two canes, { One 14 feet 6 $\frac{4}{10}$ inches long, / the other 14 feet 6 inches long, } $\frac{47}{100}$ inch diameter.

Having at the same time covered the roots of the three vine stocks, *a b c*, with a certain quantity of silicate of potassa (the soluble glass of Fuchs), we obtained the following results:

On the stock *a*, (Isabella), 48 shoots put forth from the axils, and each of these bore three or four bunches.

On the stock *b* were developed 23 shoots, having at the base a diameter of $\frac{5}{10}\frac{9}{0}$ of an inch. Upon each of these shoots there were, on an average, three bunches of grapes. The stock *c* presented 80 shoots, each bearing, on an average, three grapes. The diameter of these shoots gives a mean of $\frac{4}{10}\frac{3}{0}$ of an inch; one of them, that which terminated the wood of the last year, attained a length of 10 feet 9 $\frac{9}{10}\frac{2}{0}$ inches. From all the comparative trials which we have made, we have concluded that we must guard ourselves against confounding the development of the wood or cellulose, with that of the germ, seeing that in many cases the predominance of the one takes place only at the expense of the other. After all we do but confirm a fact already known, for we are generally aware that a tree which puts forth very vigorous shoots rarely bears fruit; and, on the contrary, that one in which the cellular development is artificially retarded is commonly loaded with it.

# CULTURE.

It is not our intention to develop the various systems followed in cultivating the vine, that we may compare them with that which we have just proposed; a labor of this sort would here be useless. The sole fact which it concerns us to establish is, that each vine stock must extract from the soil in which it is planted, the elements necessary to the development of its cells and germ, unless we furnish directly to its roots the quantity and quality of manures which suit it. In the former case, these elements are furnished to it by the successive decompositions which are effected in the bosom of the earth. Now, as the potassic salts, indispensable to fructification, proceed most frequently from the alterations which the feldspathic rocks suffer, and as these break down only through the concurrence of heat and humidity, the success of a harvest, until now, all other circumstances being equal, has depended, in great degree, upon atmospheric influences. Thus, if a vine stock requires ten parts of potassa that it may bear fruit; and if the action of heat and rain upon the

rocks and soil, in a decomposing state, can furnish but five parts, the crop fails.

This danger is warded off by our system of culture, in which the vine will constantly have proper nourishment; but it must be understood, that in guaranteeing to the vinedresser, who has recourse to it, the quantity of the product, we do not pretend to give him any assurance as to the quality, this latter being always dependent upon the temperature.

The trouble of treating each vine stock separately, would be avoided by establishing a trench of sufficient dimensions, in which should be laid down a certain number of shoots, to which should first be given all the manure indispensable to their development; then, at the end of one or two years, the quantity of potassic salts recognized as necessary to the formation of the fruit.

The various trials which we made upon a small scale having answered our expectations, and having, up to the latest moment, controlled each the others, there does not exist in our mind the smallest doubt as to the value of our experiments.

It remains only to establish by trials undertaken upon a scale of a certain magnitude, whether the wine

proceeding from a grape thus obtained has all the qualities of another wine, and whether all the varieties of the vine lend themselves advantageously to a system of culture, the details of which we shall now give.

To put the subject in a clearer light, let us suppose that on a slope sixty-five yards long by thirteen broad we desire to cultivate the vine. At the lower part we dig a trench one yard three inches wide, by about eighteen inches deep (see plate I.), according to the nature of the soil, the exposure, and the climate.

The trench should be deeper if the soil is dry and sandy, or if the climate is hot; if, on the contrary, *the soil is heavy*, the climate humid and cold, it should be shallower, that the sun's rays may exercise a greater action.

In this trench we lay down (*plant by layering*) old vine shoots, or in default of these, we plant young vine stocks, to which has previously been given the culture requisite for successful layering. In either case it will be proper beforehand to prune the vine destined for layering the following year, so as not to allow the putting forth of more than two, or at most three buds, that the sap may be accumulated upon these canes, which by increasing their strength will

cause them to attain a length of eight, or even ten feet, if possible. This length is indispensable, in order that upon the stock a *number of radicles may be developed in proportion to the respiratory organs of the stem* (the branches, leaves, and fruit).

In treating, after this fashion, either old or young vine stocks, we arrange matters so as to obtain throughout the whole extent of the trench sixty or seventy layers, each one of which is allowed to retain two buds only. Of these seventy layers, forty-eight are directed by fours around stakes E É Ë Ë, (plate I.), forty or forty-five inches set apart, which are destined to support the trellis; as for the others, they rise up on the opposite side of the trench, and are reserved to replace those which may die. In laying down the shoots, an indispensable precaution to be taken consists in removing with the pruning knife, those buds which may be found upon the stem to be buried, and to make also, upon the articulation a slight incision, which, by impeding the flow of sap, produces upon the spot *a swelling*, and eventually a proper development of radicles. By neglecting this precaution we deprive several articulations of roots. If some vine-dressers understand the advantage that there is in not

layering the vine until the moment at which the buds have acquired a certain development—a half to three-fourths of an inch—it is because, without thinking of it, they then naturally make at each articulation a wound, while detaching these buds with the thumb.

The buds having been removed, we place upon the shoots laid in the trench, about two and a half, or two and three-fourths inches in depth, of a soil with which has previously been mingled, for each square yard of trench surface.

Six pounds of bone dust, three pounds of clippings of skins, leather (shoemaker's and tanner's refuse), shavings of horns, hoofs, blood, etc., one pound of plaster; or one hundred and twenty pounds of this mixture for a trench of twelve yards long. The proportions indicated may be increased without inconvenience, since this compost acts slowly.

When the soil is tenacious or clayey, it is beneficial to mix with it, either sand or marl, or finely powdered charcoal, that the soil may be rendered mobile, and that the development of the radicles may be favored. To this end, we may also add to this stratum of phosphated compost a certain quantity of cow or horse dung. We have made experiments which prove

that if we layer a shoot, at a certain depth, so as to cause it to describe a wide letter U, the roots cannot develop themselves at a greater depth than from six to ten inches: below this either no roots at all are found, or they are rudimentary.

Though these data refer to the circumstances under which we operated, and though the surrounding temperature, and the nature of the soil may modify them, it nevertheless remains established that at the moment when the roots strike, the wood should be covered with but a moderate quantity of soil, that they may be more accessible to solar heat. Now, if heat is necessary, we can understand that the manure employed contributes, by its decomposition, not a little to hasten the development of the roots, and consequently that of the vine.

The sap being in motion, in order to assure the success of this new method of culture, we must, when the two shoots, which have been procured from each layer, have attained a length of four inches, pinch off the weaker, so that all the sap may be directed to the more vigorous one, which then takes a rapid development, and requires constant care. Thus, for example, a plantation of this kind should be visited every eight

days, the young shoots should be tied to supports, precautions being taken that the cells, which offer but a slight resistance, may not be lacerated, that the growth may not be hindered, and that we should not forget to suppress each bud growing at the axil of a leaf; then, if we have been able to layer, at least two yards six inches of shoots, and if at each articulation roots have been developed, we are sure of obtaining from the very first year stems at least sixteen feet long.

If some shoots seem unthrifty, we must not hesitate to relayer them, never leaving more than two buds to each layer.

When we have managed to develop canes as vigorous as those of which we have given the diameter, we proceed to the formation of the trellis. To this end, we plant, at a distance of two yards, twenty-five and a half inches, and at a depth of one yard three inches, three posts, E P R, É Ṕ Ŕ, Ë P̈ R̈, two yards six inches long, by a cross section of four by two and three-fourths inches. On the length of one yard three inches, which remains above the soil, we construct three stages.

*A first stage*, at fifteen and a half inches from the earth, formed by two slats L S, two yards, twenty-five

and a half inches long, by one and a tenth inch thick, and two and three-fourths to three and nine-tenths inches wide, pierced with holes throughout its whole length; these slats are fastened by the two extremities to the posts E P R, and at the middle, to the pickets *o g*, which are one inch and ninety-five hundredths square, by thirty-one inches long, fifteen and a half inches of which are buried. *A second stage*, at eleven and seven-tenths inches above the first, composed of two strong iron wires, fixed by one of their ends to the two sides *m m*, of the post E, and by the other to the points *t t* of the two sides of the post R, after having been stretched, and then turned around a nail planted in the intermediate post P.

A third stage, at twenty-three and a half inches above the first, and consequently at one metre above the soil, arranged exactly like the preceding, that is to say, in such a manner that the wires shall pass from the points *n n* to go to the points *u u*.

Of the four layers, F G H I, F́ Ǵ H́ Í, etc., issuing at the base of the posts E É Ë, we choose, in the spring, the two shortest; prune them, bend them cautiously to the two sides of the slats L S,—lower stage —and at the same time we fasten them by osier ties

1 1 1, which are passed through the holes made in these slats, parallel to one another, the articulations being caused to alternate. This arrangement, while it affords greater space to the shoots, gives to the trellis the aspect of a continued series of vines trimmed crown fashion.

The canes of the other two remaining stocks are led along the wires of the intermediate stage *m m*, *t t*, that is to say, upon each of the two sides of the posts E P R. They are fixed to the wires by means of osier ties 1 1 1, precaution being also here taken to cause the articulations to alternate. If a slat is employed for the lower stage, it is solely with a view more easily to stretch the wires, to draw more forcibly upon them, without fearing that the tops of the posts should approximate.

When the canes, which constitute the trellis, are sufficiently developed, we furnish the roots with the potassic salts which are to determine the fructification. To this end, we spread above the trench, at a distance of from two and three-fourths to three inches from *the buried vines*, four pounds, avoirdupois, per square superficial yard, of a mixture formed of eight pounds (av.) of silicate of potassa, two pounds (av.) of the

double phosphate of potassa and lime. We then fill the trench level with the surface, and the roots have, for a long time, the quantity of potassa which is necessary for them; to prevent its exhaustion, it is good to deposit each year, at the foot of the vine stocks, a certain quantity of the marc of the grape. This marc, or residuum from the press, furnishing by incineration two and a half per cent. of carbonate of potassa, restores annually to the trench a considerable quantity of the potassa which it had carried off.

We may, in the same way, usefully employ the residue of the ashes from which ley has been made, which also contains potassa, and certain plants rich in potassic salts.

# CARE TO BE GIVEN TO THE TRELLIS.

## PRUNING.

PRUNING is one of the important operations in the culture of the vine. The method which we follow is that called Thomery's. We will explain it in a few words, the figures which we give—Plate II—sparing us the trouble of entering into long details relating to it.

The first year, we prune the trained wood (fig. 1.), by removing all the tendrils 00,00; each bud gives, during the growth of the year, a new cane (fig. 2), which bears at its lower part, a bud commonly called *false bud;* after this, throughout its whole length, a series of buds opposite to one another.

The second year, the vine is trimmed from *a* to *b*, from *c* to *d*, and from *e* to *f*, so as to preserve none but the true and false buds, which in turn, become each a cane (fig. 3), and as it is to our interest to preserve the shoots on a level with their respective stages, the pruning of the third year is directed:

1st. Upon the wood of the second year, from $a'$ to $b'$ from $c$ to $d$, and from $e'$ to $f'$.

2d. Upon that of the third year, from $a''$ to $b''$, from $c''$ to $d''$, from $e''$ to $f''$.

Here again, the true and false buds each give a cane; So that on the fourth year the third pruning is directed upon the wood of the third year, in the direction of the line $a''$, care being taken not to reach the young wood, which is in juxta position with the old and from $c''$ to $d''$, and from $e''$ to $f''$; then, still preserving the two buds, we trim the young wood from $a'''$ to $b'''$, from $c'''$ to $d'''$, and from $e'''$ to $f'''$.

The young wood should be cut at a distance of six-tenths of an inch from the bud; and when the old is cut, we must be careful not to attack the principal stem, as one is often tempted to do for the sake of appearance. It is better to leave a small end, which will dry up, and may be cut away the following year without producing a wound.

## REMOVAL OF BUDS

When, toward the middle of the month of May, or a little later, the shoots of the year have acquired a certain strength, those often surrounding the false bud, and in particular those which grow at the axil of the leaves, are to be removed, that the buds of the succeeding year may be better nourished. We then pinch off the extremity of each cane, to arrest the ascending flow of the sap, and to keep it in the lower regions, thus strengthening the wood which is to bear fruit. This operation deserves the greater attention, since its effects are felt less on the crop of the year than on that of the year following.

## LIFTING.

When the vine is leafless, each cane is lifted, and after having again removed buds, if that is necessary, we attach, by means of a tie of straw or rush (plate I.) 3 3 3, etc., viz., the shoots of the lower stage, partly to the stock, partly to the wire of the intermediate stage *m t:* and the shoots of the second stage, to the wire of the upper stage *n u.* This arrangement is figured in plate I.; but we see the right side alone. The cross section, following the line x y (plate I., fig. 4), exhibits both sides at once.

After the first year, particularly after the second, the effect of the potassic salts shows itself in so marked a manner upon the vine, that the growth of wood is retarded, to such a degree that we may blend into one, the two operations just described; that is to say, after pruning, we may abandon the training until the flowering, and may remove buds, at the same time that we lift the shoots of the year. We have thus operated for two years.

In the vineyard, the dimensions of which have been given above—thirteen yards in breadth, by sixty-five in length—we may dig, at a distance of five yards fifteen inches from each other, ten trenches parallel to that of which we have just spoken, and we may establish as many trellises, separated only by the trenches. These trenches do not remain unfurnished; elevating the shoots which the layers of reserve, properly spaced off, have necessarily furnished, we then bend them in the form of a distaff around the supports J J′ J″.

Now that we have set forth the operations of the culture, let us indicate the means of procuring the composts in question. The part played by tendons, horn, hoofs, and dried blood, etc., explains the interest which there is in carefully collecting them; but as these materials, now procurable at a very moderate price, might become too dear, it is of importance to seek the means of always having at our disposition large quantities of phosphates. This would be accomplished by collecting urine, and turning it into a pit constructed of hydraulic mortar, and furnished internally with plaster—sulphate of lime. This, attacked by the salts held in solution by the urine, yields an

abundant deposit of phosphate and carbonate of lime; the ammonia passes into the state of a sulphate, and this latter, separated by decantation, might be spread with advantage on certain soils. The deposit drained, might be employed in establishing trenches, for the development of the cellular tissue of the vine.

As for the potassic salts, we must renounce the use of those which are met with in commerce, and which are very soluble. Their action on the vine is such, that they can be employed, only when mingled with eminently absorbent bodies, such as bone-black, which yields them up slowly to the roots. It is indispensable to employ none but salts which give up gradually the potassa to the vine. The most advantageous, in this respect, is the soluble glass (silicate of potassa), which is obtained commonly by fusing fifteen parts of quartz (sand), with ten parts of the potassa of commerce and two of charcoal. In this particular case, it is better to increase the proportion of potassa, to render the glass more attackable. It is, however, more economical directly to employ the saltern. (This is the residuum, after the evaporation of the lixivium from ashes, which is calcined in furnaces to furnish the potash of commerce.)

We propose fifteen parts of sand for thirty-five of the saltern. The mass thus obtained undergoes deliquescence very readily.

We may also, when in the vicinity of feldspathic rocks with a base of potassa, roast them with a certain quantity of this base in a carbonated state, fifteen to twenty per cent., with a view of accelerating their decomposition.

The phosphates, or rather the double pyrophosphate of lime and potassa, may be procured at small expense. To this end we treat twenty-four pounds of bones calcined at a white heat, pulverised and diluted with a quantity of water, sufficient to make a very thin pulp, with eighteen pounds of sulphuric acid, which we pour gradually on the calcined bones, stirring continually. Sulphate of lime* and a biphosphate of the same base are produced; then, after having added water to make it once more into a pulp, we leave it at rest for two or three days, treat it with hot water, and strain through a cloth, upon which the sulphate of lime remains; in the liquid is found phosphoric acid and phosphate of

* As this salt may be employed successfully in the first phase of the culture of the vine, the labor of washing it carefully may be dispensed with, and consequently we are not exposed to the loss of the phosphoric acid.

lime, or biphosphate; to this, is to be added carbonate of potassa, until it acquires a slightly alkaline reaction. Nothing remains to be done but to evaporate the whole in a cast-iron vessel, to dry the residuum, and to roast it at a dull red heat. The product pulverised, is mingled with the silicate, to serve for the development of the fruit. To recapitulate, according to the principles upon which rests the method of culture which we propose, we must,

1st. Occupy ourselves in the beginning, exclusively with the development of the wood, by incessant care given to the young shoots, and by the concurrence of composts, having for base the phosphate of lime and animal matter, or what comes to the same thing, bones, horns, etc., or even guano.

2d. To endeavor to cause each layer to put forth a number of roots sufficient, the trellis, once for all constructed to insure a proper ratio between the power of the organs of suction—the roots—and those of respiration, which are to elaborate the juices—the leaves and branches.

3d. The first two conditions having been realised, to give to the plant the potassic salt proper for it, so as to retard the growth of wood, and to stimulate that of the fruit.

4th. To repair the loss of potassa sustained by the trench, by restoring to it annually, as far as it is possible, this base, by the employment of the marc, residuum of ashes, and plants rich in potassa, such as those which are used already in some vineyards of the south of France.

5th. To prune the vine, keeping the wood on a level with the stages which are assigned to them.

6th. To remove the buds, observing strictly the rules which we have given.

We think that a few words will now suffice to explain the advantages, which this mode of culture has over the ordinary plan.

According to our method, all the operations of culture, the vinery once established, are reduced to the pruning, disbudding, and lifting, which may be practised at the same time. We therefore dispense with the three cultivations which are performed,

The first, in the month of March;

The second, or hoeing, in the month of May;

The third, or harrowing, during August.

Besides, it being unnecessary to employ stakes, we are exempted from the labor necessary every year, in

some vineyards, for the removal of these and their replacement, after the first tillage.

Moreover, as the trellises are a yard apart, if the soil is fertile, we may, without injuring the vine, cultivate in the space which separates them, alimentary vegetables, or plants for forage;—for instance:

*Fall barley*, which not only would not interfere with the pruning, but since it may be harvested as the vine flowers, would give every facility for disbudding, and lifting the young wood.

*Maize*, particularly the dwarf variety, seeing that this plant, proper space being allowed, would give no shade, and would always permit us to lift and tie the vines.

*Potatoes* and *carrots*, which would not at any time hinder our movements.

In fine, why should not the alleys be made into sward or artificial meadow, which could be cut with the sickle in the month of June, and consequently before the disbudding. If we have only a rocky soil, even rock itself, nothing prevents us from forming trenches in it, gathering there the small amount of soil to be found in the vicinity, and there causing, by arti-

ficial manures, the shooting of the wood, which is afterward developed on the surface of the rocks, and there caused to *breathe*. In this case we must replace the wooden posts by hollow iron rods, sealed directly into the rock, or into a stone previously sunk into the earth. We may thus devote to the cultivation of the vine, soils which are completely sterile.

There is another advantage inherent to our method, which we cannot silently pass by.

Frequently a poor crop is due to an excess of moisture, or to drought. In such circumstances, by means of earthen banks placed before the trenches, it would be easy for the vinedresser, in the first case, to direct the rain water down the land to run away by the paths: in the second, to collect by an opposite arrangement, these same waters, that they may be conducted into the trenches, there to maintain the degree of humidity necessary to vegetation.

To avoid another danger, which every year menaces the vine, that of frost, it would be easy to collect the leaves at their fall, and pile them on the foot of each stock, constituting the vinery. Here, therefore, in terminating the advantages of our method is,

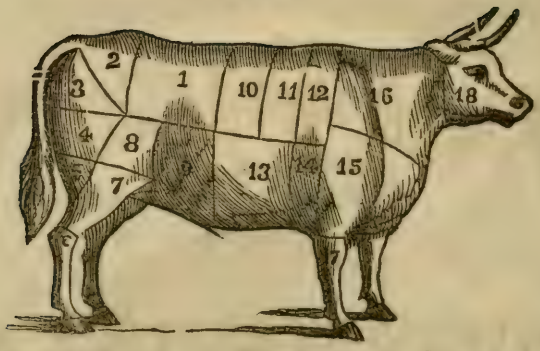
1st. A considerable reduction in the expenses of culture.

2d. The possibility of usefully employing sterile soils, even rocks.

3d. If the soil is fertile, of devoting, at least, the half of it, to the cultivation of alimentary plants, while obtaining the same crop. Surely a very precious advantage, since, with the least expense, and without increase of labor, the poor vinedresser, obliged now to barter every year the product of his toil, frequently at the very time of vintage, for the aliments necessary for the existence of himself and family, would thus find the means of procuring these, while preserving his crop of grapes; and the rich, that of coming to the assistance of unfortunate laborers without sacrificing anything of their revenues

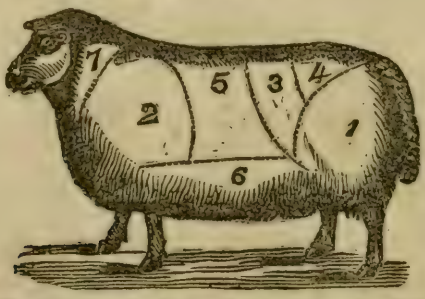
LADIES
GUIDE; OR, SKILLFUL HOUSEWIFE.

## BEEF




1. Sirloin. 2. Rump. 3. Edge bone. 4. Buttock. 5. Mouse buttock. 6. Leg. 7. Thick flank. 8. Veiny piece. 9. Thin flank. 10. Fore rib: seven ribs. 11. Middle rib: four ribs. 12. Chuck rib: two ribs. 13. Brisket. 14. Shoulder, or leg of mutton piece 15 Clod. 16. Neck, or sticking piece. 17. Shin 18 Cheek

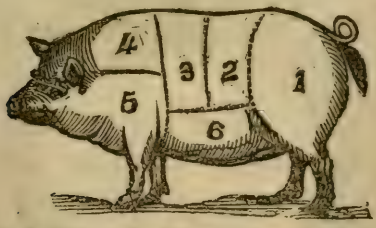
## MUTTON.




1. Leg. 2. Shoulder. 3. Loin, best end. 4. Loin, chump end. 5. Neck, best end. 6. Breast. 7. Neck, scrag end.

*Note.*—A chine is two loins: and a saddle is two loins and two necks of the best end.

## PORK.




1. Leg. 2. Hind loin. 3. Fore loin 4. Spare rib. 5 Hand 6. Belly or spring.

THE

# Skillful Housewife's Book:

OR COMPLETE

## GUIDE TO DOMESTIC COOKERY,

TASTE, COMFORT AND ECONOMY.

EMBRACING 659 RECEIPTS,

Pertaining to Household Duties, the Care of Health, Gardening, Flowers, Birds, Education of Children, etc., etc.

BY MRS. L. G. ABELL,

AUTHOR OF "GEMS BY THE WAYSIDE," "WOMAN IN HER VARIOUS RELATIONS," ETC

With Valuable Additions, by an English Housekeeper.

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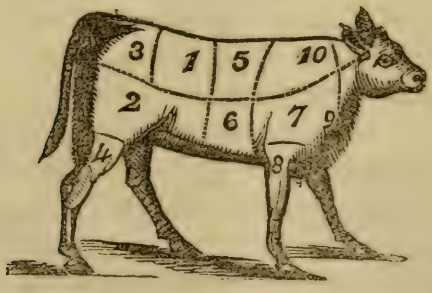

# PUBLISHER'S PREFACE

This work is the production of a highly gifted and disciplined mind. In it the Authoress gives us the result of fifteen years of careful and extended observation, while acting in the twofold character of a Christian mother, and an experienced and practical housewife. It is in truth, as will be seen at a glance, a treasury of useful knowledge, and sound practical wisdom; a store-house of principles and facts, embodying more useful information on the various topics on which it treats, than any similar work with which we are acquainted. Its object is two-fold, viz: to promote the temporal comfort and spiritual interests of families. This object, it aims to accomplish by teaching, in the broadest sense, THE SCIENCE OF LIFE. Though not written in the form of a regular treatise, the subject is presented in three aspects, moral, physical, and economical; MORAL, which relates to the religious education and government of children—PHYSICAL, which relates to the condition, infirmities, wants and management of infants—ECONOMICAL, or the art of living, of promoting and preserving health, and in general the right disposition and regulation of household affairs in conformity with the dictates of prudence and sound discretion.

In these several points of view, the subject is invested with peculiar interest to parents and heads of families. To those whose special duty it is to preside over domes-

tic concerns, the great amount of information given in so narrow a compass relative to the healing and culinary arts, is invaluable. To make it both a SAFE and useful Family Directory, the ablest medical treatises, and the most approved works on Cookery, have been diligently consulted and compared. While, then, the work unfolds and enforces the principles of sound Christian morality, it embodies all that is necessary for ordinary purposes in a treatise on domestic medicine, and the most important and valuable secrets of the culinary art.

The Authoress, with a sort of careless ease, notes down her observations and gives only such plain and cogent instructions as sink into the mind by their own weight. Nevertheless, the work bears the impress of a strong and vigorous mind, if not the stamp of marked originality and is replete with valuable hints, sparkling thoughts and just sentiments. It is a fact that the most splendid exhibitions of genius are not always the most useful. Those writings, which like Bacon's Essays, "come home to the business and bosoms of men," are destined to produce the most beneficial influence, if not to endure the longest. A work adapted to the common purposes of life, is of more real value than more pompous and erudite volumes. An honest and benevolent mind will be satisfied with being in some measure useful, without aspiring to great conspicuity. Such an one will be less anxious to accumulate praise, than to discharge the humble duty assigned to him by providence. If our Authoress has supplied the public with a valuable Household Directory, in all the great duties and concerns of domestic life, she has not written in vain, nor will she lose her reward.

THE PUBLISHER.

THE

# SKILFUL HOUSEWIFE'S BOOK

## CHAPTER I.

### MISCELLANEOUS MORAL HINTS ON THE FORMATION OF CHARACTER, HABITS, ETC.

#### EXCELLENCE THE REWARD OF INDUSTRY.

Excellence is providentially placed beyond the reach of indolence, that success may be the reward of industry, and that idleness may be punished with obscurity and disgrace.

#### TRAINING OF THE MIND.

A sound moral discipline, and a well regulated mind, can under God, carry a man through life so that he will not be the sport and victim of every change that flits across the scene. And it cannot be too anxiously borne in mind, that this great attainment is in a remarkable degree under the influence of habit.

Every day that passes, and every step that we take, without making it the object of earnest attention, renders the acquirement more difficult and uncertain, until a period at length arrives when no power exists in the mind capable of correcting the disorder which habit has fixed. The frivolous mind may then continue frivolous to the last, amusing itself with trifles, or creating for itself fictions of the fancy, no better than dreams. The distorted mind may continue to the last eagerly pursuing its speculations, departing far-

lher from the truth; and the vitiated mind may continue to the last, the slave of its impure and degrading passions Such is the power, and such the result of mental habits. We cannot determine how many acts of frivolity may constitute the permanently frivolous mind; how many trains of impure thought, may constitute the corrupted mind; or what degrees of inattention to the diligent culture of the powers within may be fatal to our best interests. In early life, aim at the mastery of the mind; give earnest attention to the trains of thought encouraged, as habits may be thus unconsciously formed, the influence of which may be permanent and irremediable, and peril the happiness of life and the immortal interests of the soul.

### RESOLUTION.

There is nothing in man so potential for weal or woe, as firmness of purpose. Resolution is almost omnipotent. Sheridan was at first timid, and was obliged to sit down in the midst of a speech. Confounded, and mortified at the cause of his failure, he said one day to a friend, "It is in me, and it shall come out." From that moment, he rose, and shone, and triumphed in consummate eloquence. Here was true moral courage. It was well observed by a heathen moralist, that it is not because things are difficult that we dare not undertake them. Be then bold in spirit. Indulge no doubts, for doubts are traitors. In the practical pursuit of our high aim, let us not lose sight of it in the slightest instance; for it is more by a disregard of SMALL THINGS, than by open and flagrant offences, that men come short of excellence. There is always a right and a wrong. and if you ever doubt, be sure you take not the wrong. Observe this rule, and every experience will be to you a means of advancement.

### PUNCTUALITY.

Method is the very hinge of business; and there is no method without punctuality. A want of this virtue would

throw the whole world into a state of confusion and disorder. Punctuality is important, because it is not only the golden chain of the universe, but because it promotes the peace, order, good temper, and happiness of a family. The want of it not only infringes on necessary duty, but sometimes excludes it. The calmness of mind which it produces is another advantage of punctuality. A disorderly person is always in a hurry, and has no time. Punctuality gives weight to character, and like other virtues, it propagates itself. Servants and children will be punctual where their leader is so.

### PATIENCE.

As the bee extracts sweets from the bitterest plants, so the patient and resigned spirit derives instruction and even happiness from the severest misfortunes and the sorest trials.

### FORGIVENESS.

A more glorious victory cannot be gained over another than this, that when the injury began on his part, the kindness begins on ours.

### TALENTS.

Dig them up—bring them to the light—turn them over, polish them, and they will give light to the world. You know not what you are capable of doing; you cannot sound the ocean of thought within you. You must labor, keep at it, and dig deep and long before you will begin to realize much. Be in-active—mourn because you were not created a giant in intellect, and you will die a fool.

### THE YOUTHFUL MIND.

A straw will make an impression on the virgin snow, but after a time a horse's hoof cannot penetrate it; so it is with the youthful mind. A trifling word may make an impression, but after a few years the most powerful appeals

may cease to influence it. Think of this ye who have the training of the infant mind, and leave such impressions thereon as will be safe to carry amid the follies and temptations of the world.

### TIME.

God who is liberal in all other gifts, shows us, by his own wise economy, how circumspect we should be in the management of our time, for he never gives us two moments together. He only gives us the second when he takes away the first, and keeps the third in his own hands, leaving us in absolute uncertainty whether it shall ever become ours or not!

### REPROOF.

Never reprove any one when they are angry. But go in the cool of reason, and passion, when all is quiet within, for then you have the greatest probability of success.

### LITTLE THINGS NO TRIFLES.

The nerve of a tooth, not as large as the finest cambric needle, will sometimes drive a strong man to distraction. A musquetoe can make an elephant absolutely mad. The coral rock which causes a navy to founder, is the work of an insect The warrior that withstood death in a thousand forms, may be killed by an insect. The deepest wretchedness often results from a perpetual continuation of petty trials. The formation of character often depends on circumstances apparently the most trivial, an impulse, a casual conversation, a chance visit, or something equally unimportant, has changed the whole destiny of life, and has resulted in virtue or vice—in weal or in woe!

### HOW TO MAKE HOME HAPPY.

It is not the imposing majesty of a sumptuous mansion, nor the hollow glare of gaudy furniture, nor the obsequious attention of servants, that make the blessedness of home

No, it is the steady exercise of those holy charities, that soothes our sorrows, and that builds the nest of peace, love, and true enjoyment in our bosoms. It is mutual respect and attention, a kind consideration of each others feelings, under all circumstances—a sympathy in our cares, a regard to our interests, the exercise of a patient and forbearing, and forgiving temper, that makes home the "only Paradise that has survived the fall." And let it never be forgotten, that even a smile or a frown may gild with brightness, or overcast with clouds, the whole horizon of that sacred spot—HOME.

### AN UNSUBDUED TEMPER.

Beware of that being, who indulges in an uncontroled temper, if you desire peace and happiness. Many a lofty mind and noble genius, has by its influence become the bane of friendship, the curse of home, and the dread of society. It destroys the peace of families, poisons the fountains of happiness, and dries up the source of every pleasure. Beauty, wit, wealth, talents, fame and honor, can never be a substitute. This one gem outweighs them all, an AMIABLE TEMPER.

### THE VALUE OF TIME.

"I shall only be idle a minute." A minute! in this time many a noble action has been performed. A minute! when resolutions have been made that have changed the after current of life. A minute! in the space which a tear reached the eye of the repentant prodigal.

### NEGLIGENCE.

There is a carelessness about some young persons that is manifest in almost every thing they do. Regardless of the future, or the opinions of others, they rush forward in some new project, and before they see their error, it is impossible to retrace their steps. If they attempt to study, it is done

superficially. If they work, it is often performed unfaithfully. When anything new is presented to their minds, they enter into it with all their hearts, to the neglect of what may be of greater importance, and by frequently changing their plans and pursuits, fail of success. Minds capable of high efforts—of splendid achievments, of extensive usefulness have been paralyzed by its influence.

### DISCONTENT.

A man of discontented mind and ungovernable passions can scarcely find a situation where he will be happy. Give him wealth, honor, luxury, ease, and all the comfort which earth can afford, still his own irritable spirit, superinduced by his own lack of moral and mental culture, will poison all

### TRUTH.

The heaviest fetter that ever weighed down the limbs of a captive, is as the web of the gossamer, compared with the pledge of a man of honor. The wall of stone, and the bar of iron may be broken, but his plighted word NEVER.

### SCANDAL.

Those who possess the least inherent purity, are the most apt to traduce and vilify others. The slanderer judges after the dictates of his own malicious heart, and thus impugns the actions, motives, and feelings of others.

### KINDNESS.

Help others and you relieve yourself. Go out and drive away the cloud from that friend's brow, and you will return with a lighter heart. A word may blight the brightest hope; word may revive the dying. A frown may crush a gentle heart. The smile of love, or forgiveness may relieve from torture.

### GRATITUDE.

Be careful to teach your children gratitude. Lead them to acknowledge every favor that they receive; to speak often

of their benefactors, and to ask blessings for them Accustom them to treat with marked attention their instructors, and those who have aided them in the attainment of knowledge or piety. Gratitude is one of our first duties to God, and should not be forgotten when due to man.

### TEMPER.

No trait of character is more valuable than the possession of a good temper. HOME can never be made happy without it. It is like flowers that spring up in our pathway, reviving and cheering us. Kind words and looks are the outward demonstrations; patience and forbearance are the sentinels within. Study to acquire and retain a sweet temper. It is more valuable than gold—it captivates more than beauty, and to the close of life retains its freshness and power

### POLITENESS.

Good breeding is both sanctioned and suggested by enlightened reason. Its principles are founded in a love of virtue and a just appreciation of the rights of others. It is by discipline and effort that we attain to that elevation of character which enables, and inclines us to practice self-denial and consult the honor and happiness of others. Let no one think it of little consequence whether he has the manners of a clown or a gentleman. Politeness is a passport to the respect and friendship of the refined and intelligent, and wins favor even from the vulgar. It is benevolence and kindness carried into the details of life, and throws a charm around its most common scenes. Let it be cultivated, and its beauties will daily unfold; with time and patience the leaf of the mulberry tree becomes satin.

### MILDNESS.

Be always as mild as you can; honey attracts more flies than vinegar. If you err let it be on the side of gentleness

The numan mind is so constituted that it resists severity and yields to softness.

### SPARE MINUTES.

Spare minutes are the gold dust of time. Of all the portions of our life, spare moments are or may be the most fruitful of evil. They are gaps through which temptations find the easiest access to our hearts. Let them all be improved with care; "Sands make the mountains as moments make years."

### THE ORDER OF A HOUSEHOLD.

To establish order in the household, one of the first things necessary is to adopt rules for its internal arrangement and government. Let there be a fixed time for meals, for worship, and retirement. Let punctuality be required from each member, and soon the habit will become fixed and permanent. This greatly helps to give stability and symmetry to the character, and will save from many a snare.

### INDUSTRY AND ENERGY.

Resolution, energy, spirit, and courage, with a faithful improvement of time, will attain any position and overcome any obstacle. An ordinary intellect will, by industry and perseverance, often accomplish more than a much superior one, deficient in energy and the power of endurance.

### CHEERFULNESS.

Those who benefit the world by their labors, who here remove a weed and there plant a flower, must be cheerful. Amidst the most adverse circumstances there are still reasons for cheerfulness. So long as there are motives to gratitude, there is cause for cheerfulness.

### GIVE A FEW MINUTES TO THAT CHILD.

Few parents realize how much their children may be taught at home, by devoting a few minutes to their instruction every day. Let the parent make the experiment only

during the hours which are not spent in school. Let him make a companion of his child, converse with him, propose questions, answer inquiries, communicate facts, explain difficulties, the meaning of things, and the reason of things, and all in so easy and agreeable manner that it will be no task, but serve to awaken curiosity and interest the mind, and he will be astonished at the progress he will make.

### SCOLDING.

I never knew one who was in the habit of scolding able to govern a family. What makes people scold? The want of self-government. How then can they govern others! Those who govern well are generally calm. They are prompt and resolute, but steady and mild.

### TO ACQUIRE A GOOD REPUTATION.

Endeavor to BE, rather than to APPEAR good. Seize the present opportunity, and improve it to the utmost in doing your duty. Be more ready to commend than blame. If you have occasion to reprove, first convince by actual kindness that it is your design to do the person good. Be faithful in every thing however small. Be honest in all your dealings, and always do to others as you would be done by. Let all know that you value your honor, and this may induce them to value their own.

### PARENTAL COMMANDS.

If you wish to be obeyed, be careful to make few commands, and see that they are obeyed. Run no hazard in giving orders that may by any possibility be disobeyed. If you make them, let nothing be an excuse for disobedience.

### WHAT EDUCATION SHOULD BE.

The foundation of education should be laid in the knowledge and love of God. Education, without MORAL TRAINING, is like a sword in the hands of a madman. "Knowledge is power" for good or for evil. See to it then, that

your children are trained in the principles of religion, honesty, integrity and virtue, in obedience, self-government, benevolence and kindness. They need line upon line, precept upon precept, and constant watchfulness over faults and habits. No schools however well conducted, no colleges however high in literary advantages, without this care and effort to establish correct principles, and form the character to virtue, can be safe for your children. They should be taught moreover, that they must be, under the blessing of God, the manufacturers of their own fortunes. Many parents toil and labour, and deny themselves the comforts of life to hoard up wealth for their children. But fit them to take care of themselves, and it will be of more value than the wealth of the Indies. The earlier you teach them to depend upon their own resources the better. See that their morals are pure, the mind cultivated, and the whole nature subservient to the laws of God, and it will be of greater value than the riches of the world. Train them up to habits of industry, economy and virtue, and it will be the best estate they can have, of which no misfortune can deprive them.

### THE INFLUENCE OF THE ELDEST CHILD

The eldest child will be a model after which the younger members of the family will be fashioned. The taste, the habits, the character of the one, will very likely be copied by the others. How great the responsibility of the parent in the culture and training then of the eldest child!

### SLEEP.

A proper degree of exercise is necessary both for body and mind. When nature calls for rest, obey her dictates In good health seven or eight hours sleep is generally sufficient. In sickness sleep is often more valuable than medicine in restoring the exhausted powers and deranged func-

tions, and when the patient can sleep it is like the "balm of Gilead" to the debilitated frame.

### IMPROVEMENT OF TIME.

Do small things, as writing a letter, making a sketch, reading a review, &c., in your leisure moments; leaving the body of the day to more important affairs. Instead of saying much about your employments or wasting time in procrastination and dread of them, set yourself quietly, promptly, resolutely about your work, and you may save hours for the acquisition of some important Art or Science. Always have convenient work at hand, that your time may be usefully employed during a social call or in moments of leisure. Much time and labor will be saved by always keeping things in order. Devise methods of expediting labor, and give to each branch its due importance. There is time enough for every work and duty; if any thing is neglected from a supposed want of time the fault is ours.

### FRANKLIN'S CODE OF MORALS.

Eat not to fulness—drink not to elevation—speak not but what may benefit others or yourself—avoid trifling conversation. Let every thing have its place, let each part of your business have its time. Resolve to perform what you ought—perform without fail what you resolve. Make no expense but to do good to others or yourself, wasting nothing. Lose no time, be always employed in something useful. Use no deceit, think innocently and justly, and if you speak, speak accordingly. Wrong none by injuries, or omitting the benefits which are your duty. Avoid extremes, forbear resenting injuries. Suffer no uncleanliness in your body, clothes, or habitation. Be not disturbed about trifles, or at accidents common or unavoidable. Imitate Jesus Christ.

## CHAPTER II.

## PARENTS.

### PRACTICAL THOUGHTS.

Be yourselves what your children should be. Avoid what they should avoid at all times; let your example be a safe and unerring guide. Are there defects in their character? inquire the cause, whether it may not be owing to some defect or fault in your own character which they have copied.

### MAXIMS FOR PARENTS AND TEACHERS.

Never give reproof if it can be avoided while the feelings of either party are excited. If the parent or teacher be not calm, his influence is diminished, and a bad example is set. If the child is much excited or provoked, he will not feel the force of argument or rebuke. On the other hand, do not defer too long. Seize the first favorable opportunity while the circumstances are fresh in memory. Reprove each fault as it occurs, and not suffer them to accumulate lest the offender be discouraged by the amount. Let your reproofs be frequent enough to convince the child that he is observed, but not so frequent as to tire. Never expose a fault to others, unless as a last resort. It blunts a child's sensibility, it discourages effort, it diminishes confidence in the reprover, excites a feeling of triumph in associates, and of envy in the offender, rather than a just sense of the fault.

### HINTS FOR PARENTS.

Never allow a child to be uncourteous and disrespectful, in language or behaviour, to yourself or others. Cultivate the affections with greater care than you would nurse a house plant; they afford more pleasure in the domestic circle, and their frailty demands your utmost attention. Allow no influences in your family but those that are gentle and kind. Teach your children to respect age and never allow them

to speak lightly of religious, or of serious things. Never be absent yourselves from church, nor suffer your child to be, unless for some cause that would prevent week-day occupations or pleasures. Keep your children employed, and they will have less time to contract bad habits; know where they are, and what they are doing, that you may guard them from danger.

### RELIGIOUS EDUCATION.

There is not a blessing of our life, not a joy of our hearts, not a pure emotion within our bosoms, or a ray of hope shed upon our pathway, but has had its origin in religion, and may be traced in all its hallowed, healthful influences, to the BIBLE. With the dawn of childhood then, in the earliest days of intelligence, should the mind be impressed and stored with religious truth, and nothing should be allowed to exclude or efface it. It should be taught so early that the mind will never remember when it began to learn; it will then have the character of innate, inbred principles incorporated with their very being.

### PARENTAL EXAMPLE.

Never forget that the first book children read is their parent's example, their daily deportment. If this is forgotten, you may find in the loss of your domestic peace, that your children only know the right path, but still follow the wrong.

### OBEDIENCE.

Remember, if you would not have all your instructions and councils ineffectual, teach your children to obey. Government in a family, is the great safeguard of religion and morals, and the support of order and source of prosperity. Nothing has a greater tendency to bring a curse upon a family, than the insubordination and disobedience of children, and there is no more painful and disgusting sight than an ungoverned child.

### BEAUTIFUL, YET FEARFUL THOUGHT.

Childhood is like a mirror catching and reflecting images all around it. Remember that an impious, profane, or vulgar thought may operate upon a young heart, like a careless spray of water thrown upon polished steel, staining it with rust that no after efforts can efface.

### NURSERY MAXIMS.

Remember that children are men and women in miniature, and though they should be allowed to act as children, still our dealings with them should be manly, and not morose; recollect, also, that every look, word, tone and gesture, nay even your dress makes an impression.

Never correct a child on suspicion, or without understanding the whole matter, nor trifle with a child's feelings when under discipline.

Be always mild and cheerful in their presence, communicative but never extravagant, trifling or vulgar in language or gesture. Never trifle with a child, nor speak beseechingly, when it is doing wrong. Always follow commands with a close and careful watch, until the thing is done, allowing no evasion, and no modification, unless the child ask for it, and it be expressly granted.

Never reprove children severely in company, nor hold them up to ridicule, or make light of their failings.

Never speak in an impatient, fretful manner, if you have occasion to find fault.

Never say to a child, "I dont believe what you say," nor even express doubts. If you have such feelings, keep them to yourself, and wait; truth will eventually be made plain.

Never disappoint the confidence a child reposes in you, whether it be a thing placed in your care or a promise.

Always give prompt attention to a child when he speaks, so as to prevent repeated calls, and that he may learn to give prompt attention when you call him.

At the table a child should be taught to sit up and behave in a becoming manner, not to tease when denied, or to leave his chair without asking. A parent's wish at such a time should be a law, from which no appeal should be made.

Even in sickness, gentle restraint is better for the child than indulgence.

Never try to impress a child with religious truth when in anger, or talk to him of God, as it will not have the desired effect. Do it under more favorable circumstances.

Improve the first ten years of life as the golden opportunity, which may never return. It is the seed time, and your harvest depends upon the seed then sown.

There should never be two sets of manners, the one for home and the other for company, but a gentle behaviour should be always required.

Selfishness that binds the miser in chains, that chills the heart, must never be allowed a place in the family circle. Teach the child to share his gifts and pleasures with others, to be obliging, kind and benevolent, and the influence of such instruction may come back into your own bosom to bless your latest hour.

Dread an insubordinate temper. Deal with it as one of the greatest of evils. Let the child feel by your manner, that he is not a safe companion for the rest of the family when in anger. Allow no one to speak to him at such times, not even to answer a question; take from him books, and whatever he may have, and place him where he shall feel that the indulgence of a bad temper shall deprive him of all enjoyment, and he will soon learn to control it himself.

### GENERAL RULES OF CONDUCT, AND DEMEANOR.

Propriety of deportment is a happy union of the moral and the graceful, and should be considered in two points of view; and ought, therefore, to direct us in our important du

ties, as well as in our more trifling enjoyments. It is the result of a knowledge of one's self, and of respect for the rights of others. The usages of the world are often the imitations of propriety, and if not based on sincerity become inconstant in every thing. It is this false politeness, this superficial observance of the mere form, that leads people to be suspicious of that which is genuine. Truth, benevolence, and kindness are the soul of genuine politeness; it is both the effect and cause of Christian civilization, and always attends upon the effort to do what is right. It is so important to every individual, that neither rank, talents, fortune, nor beauty can dispense with it, nor can any thing inspire affection like its winning charms. "Manners" says one, "are more important than laws." THESE touch us but here and there, now and then, but MANNERS are what vex or soothe us, corrupt or purify, exalt or debase, barbarize or refine, by a constant, steady, uniform, insensible operation, like the air we breathe in. They give the whole form and color to our lives; according to their quality, they AID morals or DESTROY them.

To avoid wounding the feelings of others, is the key to the secret; and he who will always regulate his sayings and doings by that principle, will rarely violate any of the essentials of good breeding. Judgment and attention are necessary to fulfil this precept, for by inadvertance or indiscretion, as much pain may be given as by designed malevolence.

Civilities always merit acknowledgment. If you have been received with respect and kindness when away from home, you owe it to those who have entertained you, to inform them of your safe return, and to thank them for their kindness and hospitality. Accommodate yourself to every grade of persons, and every class of society; but never sacrifice principles. Abhor every thing profane, licentious, intemperate and vulgar. The only way to deal with the

courteous, is to be courteous; it is the best way, also, to deal with the rude. Contempt and haughtiness are never wise and never politic. It is plain at a glance that arrogance and incivility are never the test of good breeding; they are utterly inconsistent with true dignity. A man's pride should only dwell in his PRINCIPLES, and not in his demeanor; he should be above everything which may be unworthy of his nature, and above doing any thing which shall lessen his dignity, or impair his honor. Civility teaches us to treat with proportionate respect every body according as their rank requires, and their merit demands; but nothing is more tedious than mere ceremony.

The possession and display of the easiest moral virtues will secure a more enviable popularity than the exhibition of the greatest talents without them. The ability to employ power well is the best sort of power, therefore taste in conversation is worth more than talent. Avoid opposition and argument in conversation, and be as willing to hear as to speak, and never interrupt the one speaking, nor affect to help him through with his discourse. Notice what is unpleasant in others, and avoid it; what gives you pleasure, and practice it; adopting the golden rule to all the minor affairs of life. There are those who in society are considerate, amiable, and really polite, who in private and at home are morose, rough, and ill-natured. This fault is much too common, and is one of the greatest inconsistencies of human nature. From the world they procure but a few moments' pleasure; but home is to yield the happiness of a whole life. The forms and ceremonies of politeness may be dispensed with in a measure, in the relaxations and intimacies of ones own fireside, but kind ATTENTIONS NEVER.

The duties of hospitality are of frequent occurrence and should never be omitted, even though fatiguing, and sometimes troublesome. Those who are willing to dispense

with them give occasion for unfavorable remarks, and acquire the reputation of a want of DELICACY, of a CORRECT EDUCATION, and a DESTITUTION of those KINDLY FEELINGS, which are the charm of society, and also fail in one of the loveliest of Christian duties. Selfishness and pride are the two greatest obstacles in the way of a correct deportment, the former must be banished from social life as utterly inconsistent with the practice of those virtues and graces that adorn the human character, and elevate man to his true position; the latter never finds a place in the manners of the truly WELL-BRED, and is as much at variance with the laws of ETIQUET as of RELIGION.

Extract from Washington's Code of Manners, written in his early youth—"Every action in company ought to be with some sign of respect to those present. Be no flatterer, neither play with any one that delights not to be played with. Read no papers, letters, or books in company. Come not near the papers or books of another so as to read them, Look not over another when he is writing. Let your countenance be cheerful, but in serious matters be grave Show not yourself glad at another's misfortunes. Let your discourse with others on matters of business be short. It is good manners to let others speak first. Strive not with your superiors in argument, but be modest. When a man does all he can, do not blame him, though he succeeds not well. Take admonitions thankfully. Be not hasty to believe flying reports to the injury of another. In your dress be modest, and consult your condition. PLAY NOT THE PEACOCK, LOOKING VAINLY AT YOURSELF It is better to be alone than in bad company. Let your conversation be without malice or envy. Urge not your friend to discover a secret. Break not a jest where none take pleasure in mirth. Speak not injurious words either in jest or earnest. Gaze not on the blemishes of others. When

another speaks be attentive. Be not apt to relate news Be not curious to know the affairs of others. Speak not evil of the absent. When you speak of God, let it be with reverence. Labor to keep alive that spark of heavenly fire called conscience."

### ADDITIONAL RULES.

Avoid in company all unnecessary noise or motion. Lean not your chair against the wall or furniture. Spit not upon the carpet or floor. Neither whistle or hum tunes in com pany, nor drum with your feet or fingers. There should be a steady resistance of every thing vulgar, and if the customs of society are such as to induce a violation of principle, or have an unfavorable influence on character, even remotely, it is then a duty to refuse politely, but resolutely, all participations in such practices or customs. Never fear to be singular in doing RIGHT, as this is one of the first essentials of GOOD BREEDING.

### MORAL EFFECTS OF DRESS—PROPRIETY.

A wise man in giving advice to his students enforces the importance of personal neatness and suitable attention to dress, as having an important influence upon the taste and habits of the mind. It is no less important in this particular than in producing self-respect, and in securing the respect of others. Attention to the minor articles of attire, far more than its richness and elegance, affect the mind favorably. No one should be wholly inattentive to his personal appearance; and none should be so devoted to dress and fashion as to betray a weakness of intellect, or the want of a well balanced mind. "She who spends too much time in consulting her mirror, will assuredly spend too little in looking into her own heart, and she may safely calculate that the most finished external adorning will fail to please when the inward ornaments of intellectual and moral worth are neglected and forgotten." Still as a fine

picture derives additional beauty from judicious framing, so the charms of an accomplished woman become enhanced by a proper regard to her attire; but the slave of fashion is perhaps one of the most pitiable objects in creation; and nothing can be more absurd than the adoption of every new style of dress the moment it makes its appearance.

The true standard of propriety is a medium one—neither adopt every rising novelty of the day, nor reject a consistant and becoming compliance with those alterations and changes which reflection and judgment pronounce desirable. Neatness, taste, and simplicity should be the characteristics of attire, which may always be adapted to the station in life. Due attention should also be paid to the seasons, and adaptation to the weather, as it betokens a culpable ignorance as well as egregious folly, to be unseasonably attired. When the REAL or SUPPOSED demands of fashion involve a sacrifice of health, or endanger life, let the mandate be sternly and RIGOROUSLY resisted and contemned.

### TRAINING OF INFANTS—PROTECTION FROM COLD, ETC.

The exposure of infants to a low temperature, whether from deficient or improper clothing, will prove injurious to them. It has been ascertained that out of one hundred children born in winter, sixty-six die in the first month of life, but of one hundred born in summer, only seventeen die during the first month. Also, that the mortality is greater among children born in northern, than in southern climates. From these facts it is evident that infants should be furnished with a greater amount of clothing than adults. Nothing is more common, however, than to see children with their arms, necks, and upper portions of the chest, bare. When we reflect on the close sympathy between the skin and internal organs of the body, we may easily decide on the probable cause of disease in the liver, lungs, stomach, bowels, and brain; and hence croup, catarrh, fever, diarrhea, cholera,

and convulsions, are but parts only of that wide outlet to infant life which deficient clothing creates. Some justify this course with the impression that it inures to cold and makes them hardy. This may be the case with those who have stamina sufficient to survive the experiment, but before the system is thus invigorated the child may be carried off by some inflammatory affection produced by such exposure.

### INFANT NURSING.

To set a child quite upright before the end of the first month is hurtful. Afterwards it may be done by degrees. Rubbing a child all over with the warm hand takes off the scurf and makes the blood circulate. Rubbing the ankle-bones and inside the knees will strengthen those parts.

### POSITION.

A nurse should keep the child in her arms as little as possible, lest the legs should be cramped and the toes turn inward. The oftener the posture is changed the better; do not let it lie always on one side, nor let it lie too long even if it is quiet.

### EXERCISE.

By slow degrees the infant should be accustomed to exercise, both within doors and in the open air; but it should not be moved about much after feeding; it is apt to sicken. Exercise must be gentle, not jolting on the knee.

### PREVENT DISTORTION.

Tossing a child and exercising it in the open air in fine weather, is of great service. In cities, especially, children must not be kept in hot rooms, but must have as much air as possible. Want of exercise is the cause of rickets, large heads, weak joints, a contracted breast, and diseased lungs, besides a numerous train of other evils.

Infants should by imperceptible degrees be inured to a cool and then to a cold bath. Sudden transitions are

dangerous. All attempts to render them hardy must be made by gradual steps. But when they become accustomed to a hardy system it then must be adhered to.

### CLEANLINESS.

The child's skin must be kept perfectly clean, by washing its limbs morning and evening, and likewise its neck and ears, beginning with warm water, and by degrees it will not only bear but like to be washed in cold water. After carefully drying the whole body, head, and limbs, another soft cloth, a little warm, should be used gently, to take al the dampness from the folds and fleshy parts. If the skin is chafed, the nursery powder must be dusted on. The utmost tenderness is necessary in drying the head, and no binding should be made close about it. Squeezing the head or combing it roughly may cause frightful diseases and even the loss of reason. A small soft brush lightly applied is safer than a comb. Clean clothes every morning will tend greatly to a child's health and comfort. The scurf that sometimes appears on the head should be oiled at night, and well washed with soap and water in the morning, and gently combed.

### DRESS.

A shirt, a breadth of flannel open in front, with a waist to tie before, longer than the feet, to wrap them in, a petticoat of flannel, with a waist to tie behind; over this put a robe or frock, fastened behind. Caps may be worn one, two, or three months, but not longer. The dress for night should be as for the day, except the petticoat is left off, and night gown worn.

### THE OPERATION OF DRESSING.

The most tender care should be observed in moving the infant and turning it, that it shall not feel fatigue. The clothes should all be tied on, and so loose that two fingers may be inserted between the clothes and body. Bandages

are forbidden. Idiotism and deformity are often owing to tight bandages.

### SLEEP.

Infants cannot sleep too long; it is well when they can enjoy a calm and long-continued rest, of which they should by no means be deprived, as this is the greatest support granted them by nature. A child lives comparatively much faster than an adult; its blood flows more rapidly, and sleep promotes more uniform circulation, and facilitates digestion, while a horizontal position is favorable to growth and development. Still, sleep should be proportioned to the age. After six months, the time of sleep can be regulated. An infant should always sleep the whole night in preference to the day, and, as it grows older, a few hours morning and afternoon; and, after a while, to sleep after dinner will be sufficient. After a child is four or five years old, its time of sleep may be shortened one hour every succeeding year, so that a child of seven will not require to sleep more than eight or nine hours.

### WAKING SUDDENLY.

To awaken a child with a noise, or in an impetuous manner, is extremely injudicious and hurtful; nor should it be carried from a dark room into a glaring light, for the sudden impression of light debilitates the organs of vision, and lays a foundation for weak eyes from early infancy.

### RESTLESSNESS AT NIGHT.

An infant is sometimes restless at night; this is generally owing either to cramming it with too much food, tight night-clothes, or being over-heated with too many blankets, or it may have slept too much in the day time.

### HICKUPS.

These generally arise from acidity in the stomach, and may be remedied by a little prepared chalk given in a little syrup or gruel. If very severe, the stomach should be rub-

bed with opodeldoc or liniment, with a little laudanum added.

### EXCORIATIONS.

If children are not kept perfectly dry, or, if their clothes are dried too long and become rough, they suffer much, and often they become perfectly raw about the thighs. When this is the case, the citron or yellow ointment will heal very soon. But "prevention" is far better than "cure;" great care should therefore be taken that suffering of this kind is not caused by inattention or carelessness.

### HABITS OF INFANTS.

There should be pains taken to form such habits in infancy as will be most for the child's benefit, and least trouble to those who have the care of them. It is fatiguing and irksome to be obliged either to bear the fretfulness and screams of a child, or to walk the room continually to pacify it. There is no habit sooner learned than that of being carried in the arms; it needs only be practised a few times, and it becomes necessary for the enjoyment of quiet and peace. Having a light at night is also bad, it must soon be dispensed with, or it will become necessary to continue it. Keeping a child up in the evening is also injudicious. Let it be early prepared for rest, and you will have the benefit of a quiet evening, and your child of needful sleep and a well formed habit.

### WALKING.

Let a child gain strength in the natural use of its limbs, not urging it beyond its strength to make efforts to walk. Let it practise creeping, occasionally holding it up to learn the use of the feet. But by no means press it to go alone too soon. I have seen children have a natural stoop that could never be overcome in conse

quence of walking too soon, before there was sufficient strength to support the weight.

### TEMPER.

The atmosphere in which an infant should live, should be that of gentleness. Nothing harsh or loud should ever fall upon the delicate ear of the infant. Nothing unkind or unfeeling should be made to vibrate upon its susceptible heart. It should hear no other tones than those of love and tenderness, and should feel no other influences than those of the deepest affection. Its upward turned eye is quick to discover the meaning of the look and manner, and its emotions are taking their hue from the light under which it lives and breathes. When symptoms of temper in the child are betrayed, let no exciting cause perpetuate the difficulty, but endeavor to change the current of thought by changing its place, or placing before the eye something to please, and calm the ruffled waters of its narrow but treasured life.

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## CHAPTER III.

### SIMPLE AND SAFE REMEDIES FOR COMMON DISEASES AND ACCIDENTS.

### CHILBLAINS.

These sores are caused by frost, and are very troublesome, and often painful. Where the skin is not broken, bathe the part in strong alum water. This will cure, if continued a week or two.

### BLEEDING AT THE NOSE.

Grate dried salt beef, and take two or three pinches as snuff. This is said always to cure. Other remedies will often suppress it—such as the following; Raise the left arm, and keep it up some time. Bathe the back of the

head and neck in cold water. Tie a thread very tight around the little finger.

### WARTS.

Wet them with tobacco juice, and rub them with chalk. Another.—Rub them with fresh beef every day until they begin to disappear. This last is simple and effectual.

### CORNS.

Take half an ounce of verdigris, two ounces of beeswax, two ounces of ammonia; melt the two last ingredients together, and just before they are cold, add the verdigris. Spread it on small pieces of linen, and apply it, after paring the corn. This has cured inveterate corns.

### FOR A STING.

Bind on the place a thick plaster of common salt, or saleratus moistened—it will soon extract the venom.

### RING WORMS.

Take tobacco and boil it well—add vinegar and lye, and wash often. Gunpowder and vinegar is also good. Another; Lay a penny in a spoonful of vinegar, and, after standing a few hours, wash it frequently. This will cure.

### RICKETS.

Keep the bowels regular—bathe the body in tepid salt and water. Friction, air, exercise, and nutricious diet are important.

### FOR RINGWORM AND SCALD HEAD.

Give cream of tartar and sulphur, sufficient to act upon the bowels. Wash the head with fine soap and water, and apply the citron or yellow ointment once a day. Also simmer a decoction of elder with cream, until an ointment is formed, and apply daily—washing as above and taking the cream of tartar and sulphur.

Another; Take of sulphate of potash, recently prepared, three drachms; Spanish white soap one drachm and a half; limewater seven ounces and a half; spirits of wine two drachms. Mix, by shaking well in a phial. Bathe the head a few times, morning and evening, and it will soon heal, without shaving the head.

### SALT RHEUM.

One quart of vinegar to a quarter of a pound of litharge, boiled down to half a pint. When settled, turn it carefully from the sediment. Take a stick, round at the end, and stir in two ounces of sweet oil, or more, until it forms a consistence thicker than cream. This has cured very bad cases. Remedies for the blood should always be given while healing any cutaneous disease.

### THE ITCH.

To the above, add one scruple of red precipitate, and the same quantity of pulverized sal-ammonia, and it is an infallible remedy for this dreaded and loathsome disease.

### A CREAK, OR PAINS IN THE BACK, SIDE, SHOULDER, ETC.

Spread a plaster of brown hard soap on a cloth, wet it over with volatile liniment, and sprinkle it well with cayenne pepper, and it will relieve entirely in a day or two.

### POLYPUS.

Take pulverized bloodroot and bayberry, equal parts, and use it as snuff. If the passage is nearly closed, take a small swab, wet and dip it into the snuff, and touch the diseased part as far up as possible.

### MORTIFICATION.

Apply poultices of yeast, thickened, if convenient, with flour of slippery elm, warm, and renewed often, giving the patient a glass of yeast three or four times a day, and tonic bitters.

FOR SPRAINS AND BRUISES, WHEN THE SKIN IS NOT BROKEN

Take a pint of soft soap, a handful of salt, a table spoon of saltpetre, powdered, and apply to the part affected with a bandage.

FELON.

Take blue flag-root and wild turnip, a handful of each, stewed in half a pint of hog's lard, and strained add four tea-spoonsful of tar, and simmer them together. Apply this ointment until it breaks. Add beeswax and rosin to the ointment, for a salve, to dress it with after it breaks. This is an infallible cure, without losing the joint. The root of the fleur-de-lis, the Iris of our gardens, boiled soft and mashed fine, with a little meal or flour, to make a poultice, is another safe and sure remedy. The poke-root is said to be equally good. These remedies are safe, and have given relief and effected cures.

SIMPLE AND PERFECT CURE FOR A BURN.

Take essence of peppermint and whiskey, in proportions of one part peppermint and three of spirits, and apply with cloths, and it gives perfect relief, instantly. Peppermint and sweet oil is equally good, put on with cotton. This should be always at hand, whenever there is danger from such accidents, as it acts like a perfect charm, and will not fail to relieve.

ACID STOMACH.

Prepared chalk, to be found always at druggists, is an excellent remedy for this complaint, and all the unpleasant headaches and sickness to which it gives rise. This is one form of dyspepsia, and is sometimes relieved by the use of this simple remedy.

STOP THE BLEEDING OF A WOUND.

Lay on the orifice, lint; if that is not sufficient, put on flour and then lint.

### CUTS.

Bind on brown sugar until it ceases bleeding, then apply any common healing salve, with sugar melted in it; this takes out the soreness, better than the salve alone.

### FOR WOUNDS.

Wounds occasioned by any thing that would produce lockjaw, such as nails, needles, &c., bathe with lye or pearlash water, and bind on a rind of pork. Spirits of turpentine is also good. Soft soap and salt, or chalk kept moist, is also a preventive for this dangerous disease. If from neglect, this disease has been occasioned; without delay, you must give medicine to sicken the stomach, and use a warm bath to relax the nerves, and an anodyne, once in four hours. If it does not yield to this treatment, and the jaw is so fixed that remedies cannot be taken, then give injections, with the addition of a strong tea of ipecac., and from a half ounce to an ounce of laudanum.

### AGUE IN THE FACE.

A plaster made of brown hard soap and brown sugar, mashed together, spread as a plaster, and applied, is an excellent remedy, when the inflammation is great, and will soon relieve. But a preventive and a remedy, in the commencement of this disease, is bathing the face with strong camphor, and applying volatile liniment to the gums, and getting the face and ear warm as soon as possible. Ginger poultices are also good.

### RHEUMATISM.

A simple tea of gum guiac and queen of the meadow, gives often great relief in chronic rheumatism, and in weakness of the limbs.

### EXCORIATIONS AND SORES.

For sores that will not heal with common remedies, use the citron or yellow ointment, two or

day, at the same time taking cleansing remedies for the blood. This often heals in a short time, when the skin is nearly off, in a single day, or night, and acts like a charm. It may be found at the druggists.

### DEAFNESS.

Take five drops of sassafras-oil, half an ounce of sweet oil, mix and drop into the ear, once or twice a day Another; A solution of kreosote is also recommended, the only sensation produced being an agreeable warmth.

### TIC DOLOUREUX.

The Belladonna pill sometimes gives great relief; taken once in four hours. Apply to a physician or druggist for the article. Sometimes a mustard poultice will answer.

### HYDROPHOBIA.

Wash and cleanse the wound, and apply to every part of it the nitrate of silver, commonly called lunar caustic. This destroys the poison, and the surface of the wound, which will come away. If the wound be deep, the caustic should be pointed to reach every part. If faithfully applied, a celebrated physician declares the patient perfectly safe.

### CHAPPED LIPS AND HANDS.

Take equal parts of beeswax and rosin, or Burgundy pitch, mutton tallow or sweet oil, enough to make a soap or ointment; you may add a little rose water. This occasionally applied, will relieve soon.

### TO PREVENT BRUISES FROM TURNING BLACK.

Make a plaster of salt and tallow to cover the wound

### STIFF JOINTS.

Take strong salt and water, or brine, beef's gall, one gill each, four yolks of eggs beat up; mix and shake them well together, apply three times a day. Discutient ointments are also

### BOILS.

Make a plaster of molasses and flour, or honey and flour, and apply it as often as they get dry. If very painful, make a soft poultice of bread and milk, moistened with volatile liniment and laudanum. This will ease pain, allay inflammation, and hasten a cure. Remedies for cleansing the blood should be freely used.

### TO REMOVE PROUD FLESH.

Pulverize loaf sugar very fine, and apply it to the part affected. This is a new and easy remedy, and is said to remove it entirely, without pain. It has been practised in England for years.

### CATARRH IN THE HEAD.

Some recommend bathing the head and shoulders in cold water as a preventive, and also snuff made of equal parts of gum Arabic, gum myrrh, and bloodroot, pulverized. But a more simple remedy has sometimes given great relief. Snuff new milk morning and night, not omitting it. This is a common disease, and is one cause of consumption.

### DROPSY.

A pint of the ashes of hickory bark, put in a pint of wine, and used three times a day, in doses of a wine-glass full, restored a patient who had given up the last hope of life.

### BRONCHITIS.

The application of one drop of Croton oil, rubbed on the throat daily, against the part affected, produces a singular but powerful eruption, which has restored entirely the tone and vigor of the voice. For the chronic kind, a pill of tar, loaf sugar, skunk-cabbage-root, pulverized, and taken every two or three hours, daily, as it may agree with the stomach, has cured in five or six

### CROUP.

Dissolve half a tea-spoonful of ipecac. in half a tea-cup of warm water. Sweeten it, and give a half or a whole tea-spoonful, according to the age, until vomiting is produced; then give it in smaller quantities, and less frequently. Wrap up the child to promote perspiration, bathe the throat with volatile liniment, or tobacco ointment. The above will give relief in a short time, if taken in season. Onion juice and molasses may be given to vomit, but there should be no delay. It is known by a peculiar whistling sound in the breathing, and if neglected at all, proves fatal

### PUTRID SORE THROAT.

Take two table spoonsful of cayenne pepper, one tea-spoon of salt, to half a pint of boiling water; let it stand one hour, then add half a pint of warm vinegar. Dose one table-spoonful every hour; use it also as a gargle. This has been proved infallible.

### COMMON SORE THROAT.

A simple gargle of salt, vinegar, pepper, and water, in proportions to make a pleasant combination, will cure a common soreness of the throat.

### EAR-ACHE.

Cotton wool, wet with camphor, or paragoric and sweet oil, hot, and the ear bandaged, will give relief.

### MUMPS.

Care should be taken to prevent taking cold. Perspiration should be promoted by warm drinks. If there is costiveness, give a gentle laxative. Cover the swelling with cotton, and if painful, bathe it with volatile liniment, or Cheeseman's balsam.

a weak lye. Powdered alum and barley water, as a gargle, is good. To inhale the steam of tansy, wormwood, hops, and vinegar, and to bind the hot herbs on the throat, is also good.

### ERUPTIONS.

Dissolve Epsom salts, and bathe the parts affected two or three times a day.

### NIGHT SWEATS.

Take fifteen or twenty drops of elixir vitriol, once or twice a day; the last dose at night. Cold sage tea, or Virginia snake-root, may be substituted for the above, occasionally.

### SPINAL AFFECTIONS.

Bathing in strong tepid salt and water, is good for this and other bone diseases.

### MEASLES.

Bathe the feet in warm alkali, and the surface of the body also. If the eruptions should disappear, use measures to promote perspiration. Give a gentle laxative every day, while the symptoms continue. If there is restlessness at night, give a small Dover's powder; for nausea at the stomach, saleratus water, with a few drops of peppermint, will soon relieve.

### WORMS IN CHILDREN.

Make a strong sage tea, and dissolve in it a little saleratus; sweeten it, and, if preferred, add a little milk. Salt and water is also good, especially if there are symptoms of fits.

### CANKER IN THE MOUTH.

Take half a tea-spoonful of gunpowder, and dissolve in two spoonsful of clear water. Roll up a clean cloth like a pipe-stem; lay one end in the dissolved gunpowder, and the other in a dry saucer; in a few hours, the same will contain a liquid as clear as the purest water

sweeten this thick with loaf sugar or honey, and with a soft swab touch the parts affected several times a day, and it very soon destroys the canker. It has been used for infants with success.

### TO STOP VOMITING.

A cloth wet in essence of peppermint, laid across the stomach, is good. A plaster made of pulverized cloves, ginger, vinegar, and Indian meal, and applied to the stomach, is also good. A small pill of cayenne pepper will sometimes stop it very soon.

### BILIOUS CHOLIC.

Take of saleratus, a tea-spoonful; laudanum, a tea spoonful; and mint tea, half a pint. Give a small table spoonful, every half hour, or as often as vomiting occurs, and when it is allayed, give a double portion of bilious pills, or some active physic. If the bowels are inactive, injections are the anchor of hope. If the pain is intense, they should be given at first, made as follows: To a pint of starch, add half a pint of molasses, a pint of milk, a wineglass-ful of sweet oil, or fresh lard, and a teaspoon ful of table salt. Give as much as the patient can bear every two hours, or until relief is obtained. A teaspoon-ful of laudanum may be added, if there is great pain For a common cholic—Take a tea-spoonful of Cayenne pepper, and a tea-spoonful of sugar; pour on them a tea-spoon of boiling water, and sip as soon as cool enough to drink. If necessary, give a dose of oil, or other physic.

### CHOLERA MORBUS.

Take a tea-spoonful of saleratus, of powdered cinnamon and cloves each a tea-spoonful; pour on them a pint of boiling water, and when nearly cold, add a spoonful of

an anodyne injection, made of a pint of starch, half a gill of molasses, a spoonful of sweet oil, or lard, a tea-spoon of salt, and half a tea-spoon of laudanum.

### DYSENTERY.

This disease is entirely different from common diarrhœa, and proceeds from different causes. It is inflammatory, and all stimulating remedies should be avoided. Mucilaginous drinks should be freely used; a pill of ipecac, and a small Dover's powder may be given alternately, once in two or three hours, as the case requires. A general moisture of the skin should be kept up, and, if there is much pain, give the above anodyne injection

### DIARRHŒA.

For an infant, mix a tea-spoonful of paragoric, with one of magnesia, add half a teacup of water, and sweeten it with loaf sugar. Give a tea-spoonful of this mixture once in two hours. To a child three or four years old, give it at two doses. The diet should be light and mucilaginous. Scalded milk, or arrow root, are good. If it is chronic, and continues, make a syrup of a tea-spoonful of rhubarb, of cinnamon and cloves one each, steeped in half pint of water; strain, and add two tea-spoons of prepared chalk; sweeten with loaf sugar. Dose—a tea-spoonful every hour.

## A FEW CHOICE MEDICAL RECEIPTS.

### OPODELDOC.

Take common white soap three ounces, camphor one ounce, oil of origanum half an ounce, alcohol one pint. Cut the soap and disolve it in the alcohol, in which the other articles had been previously dissolved, and cool it in wide mouthed vials for use.

### PARAGORIC.

Take opium, one drachm; flowers of benzoin, one drachm; camphor, two scruples; oil of anise, one drachm; liquorice, one ounce; spirits, one quart. Dose, a tea-spoonful for an adult; half, for a child two years old.

### DR. ROBERT'S WELCH MEDICA MENTUM.

Gum aloes, half an ounce; rhubarb, one ounce; ginger, one ounce; myrrh, one drachm; Cayenne pepper, one tea-spoonful; spirits, one quart. Steep twenty-four hours, then add a tea-cup full of sugar, and half pint of water. Take from one to two large table-spoonsful half an hour before eating. This is good for dyspepsia and other stomach derangements, and is a good family medicine for children, as well as females.

Having used this simple and invaluable medicine for more than 20 years, I can tell ALL, TRY IT. D. NEWELL.

### SEIDLITZ POWDERS.

Fold in on paper one drachm of Rochelle salts; in a blue paper a mixture of twenty grains of tartaric acid, and twenty-five grains of carbonate of soda. They should all be pulverized very fine. Disolve their contents in separate tumblers not half full of water, then pour the one into the other, it will effervesce immediately. Drink while foaming.

### SODA WATER.

Take one third of a tea-spoonful of carbonate of soda, and half that quantity of tartaric acid, loaf sugar to make it pleasant. Dissolve the soda first, and drink while it foams.

### FOR ELIXIR PROPRIETATIS.

One ounce of saffron, one ounce of myrrh, and one ounce of aloes; pulverize them, and let the myrrh steep in a half pint of rum or brandy four days; then add the

saffron and aloes; let it stand where it is warm, and shake it well twice a day for a fortnight. This given to children, a tea-spoonful once a month, will prevent their being troubled with worms, or it is also good for adults occasionally.

### HEALING SALVE.

Take equal parts of rosin, beeswax, and sweet oil; melt and mix, stirring until cool. This is a good healing salve for all common sores, but if a more healing remedy is needed, add to this when almost boiling hot, two pounds of red lead; when almost cold, add half an ounce of pulverized camphor. This should be spread thin and renewed once or twice a day.

### RHEUMATIC TINCTURE.

Take camphor, two drachms; gum guiacum, one ounce; nitre, one ounce; balsam Tolu, two drachms; spirits, one quart; mix well. Dose, half a tea-spoonful in a little water three or four times a day.

### TINCTURE FOR SPASMS—CRAMP IN THE STOMACH, ETC.

Take four ounces of camphorated spirits; four ounces of essence of peppermint; half an ounce of spirits of Ammonia; one tea-spoonful of cayenne pepper, and two of ginger. Dose, according to age and urgency of disease. One table-spoonful every quarter, half, or one and two hours. It must be diluted with a little water; sweetened if preferred. This is valuable in sudden sickness.

### SIMPLE MIXTURE FOR ALL BOWEL COMPLAINTS.

Take rhubarb, one ounce; saleratus, one tea-spoonful; pour on them a pint of boiling water. When cold, two tea-spoonsful of essence of peppermint. Dose as above.

### BLACKBERRY SYRUP.

Take 2 quarts ripe black berries, 1 pound of loaf sugar, half an ounce of nutmeg, half an ounce of cinna-

mon, 1 quarter of an ounce of cloves, the same of alspice boil all together for a short time, and when cold add 1 pint of brandy. Strain and bottle. Dose, from a teaspoon to a wine glass full, 3 or 4 times a day. This by some is considered a specific in summer complaints.

### URINARY MIXTURE.

Acetate of potash 2 drachms, honey half an ounce, spirits of turpentine half a drachm, carbonate of soda half a drachm, peppermint essence, or tea, according to he taste. Dose, 2 table spoonsful 3 times a day. Gum Arabic to be taken in connection. This is good in cases of obstructions.

### SYRUP FOR PURIFYING THE BLOOD.

Take 6 pounds of sarsaparilla, 3 ounces of gum Guiacum, 2 pounds of the bark of sassafras root, 2 pounds of elder flowers, 2 pounds of burdock root, add 1 gallon of cheap spirits and 1 gallon of water; boil and pour off the liquor repeatedly until all the strength is obtained. Boil down to 6 quarts; add 15 pounds of sugar or more, to make a syrup. Dose, a wine glass 3 or 4 times a day. Add to each bottle half a teaspoon of saleratus. The tea of yellow dock and burdock are also good.

### VOLATILE LINIMENT.

Take 1 ounce of spirits of ammonia or hartshorn, and add sweet oil until it is as thick and looks like cream This is good for an external application in all swellings and inflammation.

### BALSAM OF HONEY.

Take of balsam of Tolu, 2 ounces; gum storax, 2 drachms; opium, 2 drachms; honey 8 ounces. Dissolve these in a quart of spirit of wine. This balsam is very useful in hoarseness, and allaying irritations of the lungs. It will often cure a cough that is alarming.

### GODFREY'S CORDIAL.

Dissolve half an ounce of opium, 1 drachm of oil of sassafras, in 2 ounces of spirits of wine. Mix 4 pounds of treacle with 1 gallon of boiling water, and when cold mix together. This is the celebrated cordial so much used for children.

### FOR TOOTHACHE PASTE.

Take gum of opium, gum camphor, and spirits of turpentine, equal parts, rub them in a mortar to a paste. Put in the hollow of the tooth This, it is said, will cure and prevent from ever aching.

### COUGH SYRUPS.

Take Iceland moss, 2 ounces, 4 poppy heads, 4 table spoonsful of barley; put in 3 pints of water, boil down to two, and strain it. Add 1 pound of sugar. Dose, a table spoonful whenever the cough is troublesome. Another, boil down thoroughwort to a thick syrup, and sweeten with molasses. This cures when other remedies fail.

### EYE WATER.

Take half an ounce of white copperas and dissolve it in a pint of soft water. Wet the corners of the eye 3 or 4 times a day or every hour. Another, take of white vitriol as large as a large pea, the same of salt, an ounce of water, and a small piece of opium. Use 2 or 3 times a day.

### TINCTURE FOR WATERBRASH.

Take of compound tincture of senna, 8 ounces; tincture of balsam of Tolu, half an ounce. Mix and take a table spoonful every morning fasting. Anti-dyspeptic pills are also good.

### VOLATILE PLASTER FOR WHITE SWELLINGS

Melt together in an iron ladle, or earthen pipkin 2 ounces of soap, and half an ounce of litharge plaster

When nearly cold stir in a drachm of salammoniac in fine powder; spread upon leather, and apply to the part affected.

### OINTMENT FOR INFLAMED EYE-LIDS.

Take of prepared calomel, 1 scruple; spermaceti ointment, half an ounce. Mix them well in a glass or marble mortar, and apply a small quantity to each corner of the eye every night and morning, and also to the edges of the lids. Take occasionally a dose of Epsom salts. If the above does not remove the inflammation, take acetated zinc, 6 grains; rose water, 6 ounces; mix and apply before the ointment is used. It is said that these remedies have succeeded in every case to which they have been applied.

### HERBS.

All medicinal herbs should be gathered while in blossom, and before the frosts have injured them. They should be well dried, and then they will be much stronger if kept from the air.

The uses of the common herbs are too well known perhaps to need any directions. Thoroughwort is excellent for coughs, colds, and liver and stomach derangements. A tea of catnip is opening to the pores. Lettuce and motherwort are soothing and quieting to the nerves, and are for the nervous and wakeful an excellent drink. Hop-tea, with saleratus dissolved in it, is invaluable for all common and frequent headaches, derangement of the stomach by acidity, &c. It is a good plan to gather burdock and horse-radish leaves and dry them. When dipped in hot water or vinegar they are good for agues, inflammations, pains, &c., applied externally.

### POISONS.

Every person ought in some measure, to be acquainted with the nature and cure of poisons. Those affected by them are generally taken unawares, and their effects are

often so sudden and violent as to admit of no delay. No great degree of medical knowledge is here necessary; the remedies for most poisons being generally at hand, or easily obtained, and their application easy.

### ANTIDOTES.

The first thing to be done when a person has swallowed poison, is to ascertain what it is he has taken; next, to be speedy in resorting to appropriate remedies, and if one fails, to try others without loss of time.

#### ACIDS.—OIL OF VITRIOL, AQUAFORTIS, SEA-SALTS, OXALIC ACID

Symptoms—Burning heat in the mouth and stomach, bad breath, an inclination to vomit, or vomiting various matters mixed with blood, hickups, &c., so great pain in the bowels that not even the weight of a sheet can be borne, burning thirst, difficulty of breathing, &c. Remedies—Mix an ounce of calcined magnesia with a pint of water, and give a glass full every 2 minutes. If it is not at hand, use flaxseed tea, rice water, or water alone in large quantities until the former can be procured. If it cannot be obtained, disolve an ounce of soap in a pint of water, and take a glass full every 2 minutes; chalk or whiting may be taken, and give injections of milk often. If the patient does not vomit, put him in the warm bath, bleed him freely, and apply blisters over the part pained. If the cramps continue, take a cup of common tea, an ounce of sugar, 15 or 20 drops of laudanum every quarter of an hour. No nourishment but sweetened rice water is to be taken for several days. In these cases nothing should be given to cause vomiting.

### ALKALIES.

These substances produce the same effects as acids, causing dreadful convulsions. Remedies—Take two tablespoons-ful of vinegar or lemon juice in a glass of water at once, and follow it up by drinking large quantities of soap and water; other treatment as in acids.

MERCURY, COROSIVE SUBLIMATE, RED PRECIPITATE, VERMILION

Symptoms—Constriction and pain in the throat, stomach, and bowels, vomiting and convulsions. Remedies—Mix the white of 12 or 15 eggs with two pints of cold water, and give a glass full every 2 minutes, with as much milk as can be swallowed, and large doses of ipecacuanha. If after it is taken, the vomiting does not cease, repeat the same with the addition of more water. The warm bath, blisters, leeches, &c., may be used to relieve the pain and inflammation.

ARSENIC.

Symptoms the same as in mercurial poisons. Remedies—Give large quantities of cold sugar and water, until a plentiful vomiting is induced, to assist which give ipecacuanha in considerable doses, and barley and rice water, or flaxseed tea and milk, should afterwards be employed. Oil is never to be used until the symptoms are abated, or the poison is ejected. Another—Hydrated peroxide of iron has been administered with perfect success. It is said to overcome the effects of the poison immediately.

COPPER.

The symptoms from the swallowing of verdigris, are nearly the same as those of the mercurial poisons. The great remedy is, large quantities of sweetened water; in addition, use all the means recommended for corrosive sublimate, &c.

LUNARCAUSTIC.

Disolve 2 table-spoonsful of table salt in 2 pints of water a few glasses of this will induce vomiting. If not relieved, use flaxseed tea, and other remedies good for acids.

SALTPETRE

Pursue the plan recommended for arsenic in the first directions.

LEAD.

Dissolve a handful of Epsom or glauber salts in a pint of water and give it at once; after vomiting is produced, use sweetened water. If the symptoms continue, do as directed for acids.

POWDERED GLASS.

Stuff the patient with thick rice pudding, bread, potatoes, or any other vegetable; then give five grains of tartar emetic to vomit him, after which use milk freely; injections, warm bath, fomentations, are not to be neglected.

OPIUM.

Let a tea-spoonful of Cayenne pepper, or twice the quantity of black, be steeped in about half a tea-cup of boiling water, give a tea-spoonful as often as possible until the whole be down. Immediately after give an emetic, as soon as it operates freely the patient should take a little more of the Cayenne and a table-spoonful or more of lemon juice, or strong vinegar, and kept in motion until danger is over. In an hour after taking the lemon juice, give a little broth or light nourishing food, well seasoned with Cayenne or black pepper. This simple process will always subdue the poison of opium or any other narcotic. Infants have been relieved and saved from an over dose of paragoric or laudanum, by giving a spoonful of vinegar immediately.

MUSHROOMS.

Give the patient immediately, three grains of tartar emetic; twenty-five or thirty of ipecac; and an ounce of salts, dissolved in a glass of water; one third to be taken every fifteen minutes until he vomits freely, then purge with castor oil.

TOBACCO, HEMLOCK, NIGHT-SHADE—SPURRED RYE, ETC.

An emetic, as directed for opium. If the poison has been swallowed some time, purge with castor oil. After vomiting and purging, if still drowsy, bleed and give vinegar and water.

### POISONOUS FISH.

Give an emetic. If it has been eaten some time, give oil and injections. After these have operated, twenty drops of ether may be taken on a lump of sugar. Vinegar and water may then be given.

### BITE OF A SNAKE—MAD DOG, ETC.

The moment a person is bitten, apply a ligature above the wound, and compressed lightly by winding it up with a stick, close as it can be borne. Cut out the wound, and then touch it with caustic, or pour in turpentine. A decoction of Spanish flies and turpentine should be applied to the skin around the wound to excite inflammation and suppuration, which is highly important. As soon as it is cut, take off the ligature. If the patient is too timid to bear the knife, burn the wound freely with caustic, and put in cotton well moistened with the above. The discharge of matter should be kept up some time. The use of the chlorwerts in these cases is much used with water in France and Germany. Apply it twice a day with lint; and take, three times a day, from two drachms to an ounce.

### FOREIGN SUBSTANCES IN THE THROAT.

Persons are sometimes in danger of suffocation from fish-bones, pins, &c., that stick in the throat. When this occurs, desire the patient to be perfectly still, open his mouth and look into it. If you can see it, endeavor to seize it with your thumb and finger, or a long slender pair of pincers. If it cannot be got up, or is not of a nature to do injury in the stomach, push it down with the handle of a spoon or a flexible round piece of whale bone, the end of which must be covered with a roll of linen or any thing of the kind that may be at hand. If you can neither get it up nor down, place six grains of tartar emetic in the patient's mouth; as it dissolves it will make

him excessively sick, and in consequence of the relaxation, the bone or whatever it may be, will descend into the stomach or be ejected from the mouth. If a pin, button, or other metalic pointed body, has been swallowed, give rice, or other pudding plentifully, to sheathe the mach from danger.

### DRY MORTIFICATION.

This sometimes comes of itself without apparent cause It attacks the toes of old people, and appears in small bluish or black spots, which spread. Place a blister over the spot, and give two or less grains of opium night and morning, and keep the bowels open by castor oil.

### TO STOP THE BLEEDING OF WOUNDS.

If the flow of blood is but trifling, draw the edges of the wound together with your hand, and hold them in that position some time, when it will frequently stop. If, on the contrary, it is large, of a bright red color, flowing in spirts, or with a jerk, clap your finger on the spot where it springs from, and hold it there with a firm pressure, while you direct some one to pass a handkerchief around the limb above the cut, and tie it in a hard knot. A cane or stick of any kind must be passed under the knot, and turned round and round, until the stick is brought down to the thigh, so as to make the handkerchief of considerable tightness. You may then take off your finger; if the blood still flows, tighten the handkerchief with a turn or two of the stick until it ceases. The patient may now be removed, taking care to secure the stick, without running any risk of bleeding to death by the way. This is merely to prevent bleeding fatally until a surgeon can be called. If the wound is too high in the limb to admit of the handkerchief, press on above the wound, with the hand or anything that is of a hard substance.

### POISON FROM ANIMAL PUTRIDITY.

It is not generally known that animal matter becoming putrid, under certain circumstances, is a virulent poison, capable of destroying life if taken into the circulation, applied to the stomach, or to an abraded surface. Scarcely a year passes but more or less valuable life is sacrificed in this way. The physician and student, from a prick, a scratch, or trifling sore, at which this poison has entered the system, in a post mortem examination, have experienced its fatal effects. It is equally true that the matter from Erysipelas and other sores, after death, have been the cause of the same evils.

Cheese, after having undergone certain change, becomes animal poison. Sausages may become so from being kept too long. Meat will also become hurtful in the same way, though boiling-hot water will arrest it, and it may be rendered safe by using saleratus in cooking it. As the result of experiment, it is found that putrifying muscle, or pus, if placed on a fresh wound, will cause disease and death. But boiling water or alcohol will render it innoxious.

## CONTAGION, INFECTION, ETC.

### PURULENT OF OPTHALMIA.

In this affection, the discharge from the eyes is capable of communicating the disease if applied to a healthy person. The towels used by the patient, should not be used by others. And any one attending another in this complaint, should be careful to wash his hands, after having washed their eyes, etc. In this disease, the patient should sleep alone.

### ERYSIPELAS.

This is known by diffuse swelling, accompanied with a red blush. or suffusion, on the face, arms, &c., which feel

ourning hot, and is attended with symptoms of fever. The apartment should be cool and well ventilated; the changes of linen frequent. If there should be appearance of matter, the nurse should cover any scratch with lard when touching the discharge, and immediately after she has been handling the parts, should wash her hands with soap and warm water. All the directions of the medical attendants should be strictly obeyed.

### RINGWORM OF THE SCALP.

Children who are affected with this complaint, should be separated from other children. It is a disease that is apt to resist remedies, but it may be cured with proper applications faithfully applied.

### ITCH.

It is scarcely necessary to give any caution on this subject. It is not difficult to cure, and is never a primary disease, only among the lowest and uncleanly of the poor, but is imparted by contact.

Infectious diseases are communicated through the air, some of the most common are the following:

### WHOOPING COUGH.

This disease should never be allowed to take its natural course, but should be treated with remedies appropriate to its distressing nature. Riding, well ventilated rooms, mild and loosening syrups, are very beneficial.

### DYSENTERY

Is characterized by frequent and bloody evacuations and continued fever. It requires perfect cleanliness, and the instant removal of all evacuations.

### SCARLET FEVER

Requires a cool apartment, very free ventilation, and frequent changes of linen. The nurse should be one who has had this disease.

### MEASLES.

They require a warm, or at least a temperate apartment, free from currents of air; sudden changes of heat and cold are dangerous. Clean linen should be carefully aired The diet, farinaceous; the beverage, toast-water.

### SMALL POX.

In this loathsome disease, the apartment should be large, cool, and well ventilated. The windows should be open day and night, and the linen changed daily. During the discharge of the pustules, change it twice a day. The patient should be taken into the open air often. Children and others, even if they have been vaccinated, should not visit the sick-rooom, though they need not leave the house. After the disease is over, the bed and bedding should be scoured, the room fumigated, and thoroughly cleansed.

### TYPHUS FEVER.

If the apartment is large, airy, and clean, there is little danger from infection. The simple process spoken of in another part of this work, will prevent any bad effect from the disease. The sheets and body linen should be changed once or twice in 24 hours, and instantly removed from the room, as well as all evacuations. Chloride of lime, or common lye, should be used in the night-chair or bed-pan. It is well also to use it in washing the clothes.

### CONSUMPTION.

The apartment should be large and well ventilated, but the temperature mild and equable as possible, about 65o Fahrenheit. The diet should be light, mostly vegetable and farinaceous. The invalid should take moderate exercise, either in a carriage, or on horseback, sailing or swinging; exercise should be taken within doors. This disease by many, is thought to be contagious. On the Island of Cuba, they have a law that furniture and clothing, when there is a fatal termination, shall be destroyed, the walls co

be removed and newly plastered. This we think unneces sary, but it is well to cleanse the air, and use precautions in the preservation of health during any case of fatal sickness.

When contagious or infectious diseases occur in a family here should be no yielding to fear or alarm. The mind should be calm, and as undisturbed as possible, as the depressing passions render a person very susceptible to the poison of contagion or infection. The diet should be more generous than usual, and disinfecting agents should be frequently used. Cleanliness in every respect, and ventilation, are indispensable. By such management and precaution, diseases of these classes rarely extend.

### INFLAMMATORY DISEASES.

Except when the chest is the seat of disease, the temperature should be rather low or cool. Directions are generally given by the medical attendant, but when this is not the case, it may be laid down as a general rule, to avoid giving animal food, wine, spirits, porter, or any stimulants, in this class of complaints. Liquid food is most suitable, arrow root, toast-water, &c., &c. The medical treatment in such diseases is more active than in others, and as they run their course rapidly, very much depends on strict attention to the direction of the physician. Ill-judged tenderness and indulgence should never spare the invalid child its dreaded and nauseous dose, for its precious life may depend upon its being faithfully administered. Care should be taken when the patient is partially recovered, not to bring on a relapse by over eating, indulgence in improper food, and over exertion. He should proceed timidly and gradually in renewing all his former habits and employments.

### DISEASES OF DEBILITY.

Under this term may be comprehended all those various and often chronic diseases that originate chiefly from a disordered state of the digestive organs, and a deranged and

impaired state of the nervous system. They have more or less influence on the mind and require peculiar management. Every thing should be done to promote cheerfulness, and to encourage hope in the invalid; it does good like medicine, and medicine does little good without it. The most careful attention should be paid to diet, clothing and exercise, and the mind kept as much as possible from dwelling on desponding subjects. Let them understand that it is a part of the disease to apprehend the worst, and in every new pain to fear a new disease. This will give the mind repose, and allay its apprehension, preparing the way for recovery.

### HINTS FOR NURSING THE SICK.

The person who acts as nurse, should be present during the doctor's visit to the patient, and should help the sick in giving account of himself. Exactness and punctuality in following prescriptions, is indispensable; no one should be employed, who would not make it a point of conscience. There should always be a time-piece at hand, that different doses may not interfere with each other. Nothing should be concealed from the physician, that is important for him to know. The countenance should wear a cheerful expression, and all the movements should be gentle and noiseless as possible, in a sick room.

It is rarely proper to wake a patient for any thing, as sleep is often more useful than medicine, and should never be done, unless the physician deems it necessary. Never burden the sick with officious and unmeaning attentions, and never let them feel the want of care.

Trifles that would not disturb the mind of one in health, will often annoy, and even distress the invalid; the clatter of renewing the fire, the careless opening and shutting of doors, all harsh movements, should be studiously avoided.

Great care should be used in preventing colds in changing the linen, and in removing the patient from one bed to

another. Chills are often a consequence of a cold fresh bed when a little care would have prevented it. A flannel sheet to wrap around the person, is a great safeguard especially if there are no conveniencies for warming the bed. The linen should be well aired and warmed, before being used, and then the utmost caution is necessary in preventing chills from the external air, which has often been the cause of much suffering. A blanket, or shawl, should be constantly at hand to put around the shoulders when sitting up in bed. Let a towel be spread over the sheet, when the food or liquids are taken, to prevent untidiness. The bed-clothes should be straightened, and the pillows smoothed frequently; it is refreshing to the weary and often restless sufferer.

If you are only a watcher for the night, be sure to understand the directions for food and medicine, and omit nothing. Take care of your own health by being warmly clad, during the chillness of night, and if the patient requires air, protect yourself from its influence. Have the sick room quiet at an early hour, with things so arranged, that but little movement shall be necessary through the night. Do not refuse to take refreshment; plain food supplies the place of sleep, to the exhausted body, and helps one to keep awake. When friction is used have mittens made of flannel and tied around the wrist, it is more convenient for the nurse, and more soothing to the patient. When hot fomentations are needed, dip the cloth in the hot water, and fold it in a cool towel, wringing both together to prevent burning the hands. Feverish patients are greatly refreshed by sponging the hands, face, and feet with tepid water. When the feet are to be bathed in warm water, add hot water as fast as it cools, and when bathed long enough, wipe one at a time with a warm dry towel, and cover it with a woollen stocking. In dressing a blister have every

thing ready before the operation is commenced, as the air is as painful as a burn, and when you have opened the lower part of the blister, and let out the water, cover it as quick as possible with wilted leaves or salve. Keep every thing about the patient's bed and room perfectly clean; one "KEEP CLEAN is worth ten MAKE CLEAN." Fresh air is of vital importance, and great pains should be taken to change it often, as well as to purify it. When you nurse the sick never allow your patience or self-possession, to get exhausted; but let this thought cheer you in what you do. It is better to be the NURSE, than the PATIENT. If you discover infirmities of temper in the invalid, learn to avoid similar faults when you are equally tempted and are suffering yourself.

But above all other considerations, remember that you are helping to detain a soul from its final destiny, and that although the tenement is the special object of attention, let not the more important part be forgotten or neglected. Be alive to every word, look, or gesture that indicates the wants of the deathless spirit. Reading a portion of the Bible or some spiritual work, adapted to the occasion, may be rendered of infinite service to one shut out from the cares of the world, under the discipline that is designed for the improvement of the spiritual life.

Suffer not your own natural diffidence on such subjects to deter you from eliciting confidence or imparting and securing instruction for the soul struggling to be free.

## PREPARATION FOR THE SICK.

### WATER GRUEL.

Mix two table spoonsful of Indian or oat meal with three of water. Have ready a pint and a half of boiling water in a sauce pan or skillet, perfectly clean; pour this by degrees into the mixture in the bowl; then return it back into the

skillet and place it on the fire to boil. Stir it, and let it boil nearly half an hour. Skim it, and season it with a little salt. If it is admissible, a little sugar and nutmeg renders it more palatable. Also, if milk is not forbidden, a small tea-cupful added to a pint of gruel, and boiled up once, makes a nice dish for an invalid.

### MILK PORRIDGE.

This is made nearly in the same way as gruel, only using half flour, and half meal, and half milk instead of water. It should be cooked before the milk is added, and only boiled up once afterwards.

### ARROWROOT.

A tumbler of this may be made in two minutes if you have boiling water. Take a tea-spoonful of the powder, moisten it with a table-spoonful of cold water, rub it smooth, and add another of warm water, and stir it until it is perfectly smooth, then pour on boiling water, stirring it until it changes to a transparent substance. It may be seasoned simply with salt, or with lemon juice and sugar, or with sugar and nutmeg, with a little milk. It may be made thick as blanc mange, and eaten with cold cream and sugar.

### BEEF-TEA.

Take one pound of lean fresh beef cut thin, put it in a jar or wide mouthed bottle, add a little salt, place it in a kettle of boiling water to remain one hour, then strain it, and there will be a gill of pure nourishing liquid. Begin with a tea-spoonful and increase as the stomach will bear. This has been retained on the stomach when nothing else could be, and has raised the patient when other means have failed.

### WINE WHEY.

Take half a pint of new milk, put it on the fire and the moment it boils, pour in that instant two glasses of wine and a tea-spoonful of powdered sugar previously mixed. The curd will soon form, and after it is boiled, set it aside until the curd settles. Pour the whey off and add a pint of boiling water, and loaf sugar to sweeten to the taste. This may be drank in typhus and other fevers, debility, &c.

### SAGO.

To a tea-cupful of sago, allow a quart of water. Let it

soak two or three hours, then boil it with some lemon peel until it is a clear transparent jelly. Milk may be used. Powdered loaf sugar, cream and nutmeg may be taken as sauce.

### CALVES FEET BLANCMANGE.

Put a set of calves feet nicely cleansed and washed, into four quarts of water and reduce it by boiling to one quart; strain it and set it by to cool. When cold, take off all the fat, and remove all the settlings at the bottom, and put to it a quart of new milk, with sugar to taste, and boil it a few minutes. If you wish to flavor it with lemon peel or cinnamon, do it before boiling; if with rose water, peach water, essence of lemon, do it after. When boiled ten minutes, strain it through a fine sieve into a pitcher, and stir it till it cools. When only blood warm, put it in moulds that have been wet with cold water, and let it harden. This is good for the sick or well.

### PANADA.

One of the most simple and least hurtful dishes for the sick, is cracker panada. Take half a bowl of boiling water, two or three large lumps of loaf sugar, roll a Boston cracker into fine crumbs, and when put in the bowl, grate over a little nutmeg. It is very simple and palatable. If wine is given, a tea-spoonful improves it.

### BREAD PANADA.

Take off the crust and boil two slices of bread in a quart of water about five minutes. Then take out the bread and beat it smooth in a dish, mixing with it some of the water in which it was boiled. Put in sugar and nutmeg to your taste, and if allowed a small piece of butter.

### CHICKEN JELLY.

Cut a chicken into small pieces, bruise the bones, and put the whole in a stone jar and cover it close. Set the jar in a kettle of boiling water, and keep it boiling three hours Then strain off the liquid, and season it with a little salt, pepper, mace, &c., or with loaf sugar and lemon. Return the chicken to the jar and boil again; it will produce nearly as much as before of jelly. It can be made just as well of an old fowl.

### CUSTARD EGG.

When a patient can bear a raw egg, it is very strengthening. Beat it and prepare it with sugar, milk, and nutmeg, and, as a drink, it is delightful.

### BREAD JELLY.

Toast four slices of stale bread, until they are of a light brown, having first taken off the crust; lay the bread in two quarts of boiling water, add if you please, two table-spoonsful of lemon-juice, and let the bread boil to a jelly. Strain and sweeten it, and flavor with lemon-peel or nutmeg. It is excellent for very sick persons, or young children.

### TAPIOCA JELLY.

Wash four table spoonsful of tapioca, and soak it in water enough to cover it, five hours. Set a pint of boiling water on the fire, and stir into it the tapioca. Put in a stick of cinnamon or mace, and let the whole simmer gently; When thick and clear, mix two table-spoonsful of white sugar, half a table-spoonful of lemon-juice, and half a glass of white wine, if the patient can bear it, and stir into the jelly; then turn it into cups.

### RICE GRUEL.

Take one spoonful of rice, a pint and a half of water, a stick of cinnamon or lemon-peel, boil it soft, and add a pint of new milk; strain it, and season with a little salt. If you make it of rice flour, mix one spoonful with a little cold water smoothly, and stir it into a quart of boiling water. Let it boil five or six minutes, stirring it constantly. Season it with salt, nutmeg, and sugar, and if admissible a little butter. If the patient bears stimulants, a little wine may be added.

### CALVES' FEET BROTH.

Boil two feet in three quarts of water until the water is half gone. Take off all the fat, season with a little salt, and, if suitable, a spoonful of white or port wine to a teacupful. This is nourishing and strengthening for an invalid. If a richer broth may be used, boil with the feet two ounces of veal, or beef, a slice of bread, a blade or two of mace.

### CHICKEN, BEEF, OR VEAL BROTH.

This is made by cutting up the chicken, or the lean of veal or beef, and putting in two spoonsful of washed rice, and boiling until tender. It may be used, if needed in haste, after boiling in less water about 15 minutes, then filling it up and finishing. It should be put by in a bowl or pitcher covered, to keep for use. Warm it, and add crumbs of Boston crackers or bread a day or two old, with a little salt, and there is nothing more palatable for the sick.

### TOAST—WATER.

Take a thin slice of stale bread, toast it brown on both sides slowly and equally. Lay it in a bowl, and pour on boiling water, and cover with a saucer to cool.

### HOT LEMONADE.

Cut up the whole of a lemon, rind and all, add one teacupful of white sugar, and pour on boiling water. This is good for colds, and is a pleasant drink for the sick.

## CHAPTER IV.

## HINTS ON THE PRESERVATION OF HEALTH.

### WET CLOTHES.

It is impossible for people who go out much to avoid sometimes being wet. But the danger may be lessened, if not wholly prevented, by changing them soon. When this cannot be done, they should keep in action until dry. Wet clothes obstruct the perspiration, and even the most healthy are not proof against their ill effects; they occasion fevers, rheumatism, and consumption. Wet feet also are injurious. The delicate should especially be cautious in this respect.

### CHANGES IN THE ATMOSPHERE.

With us the degrees of heat and cold are not only very different in the seasons of the year, but often change from one extreme to another, in the course of a few days, and sometimes in the course of one day. The best method of fortifying the body against the changes of the

weather, is to be abroad every day. Those who keep within doors are most liable to catch cold. They become so delicate that the slightest changes affect them, and are frequently afflicted with pains, coughs, oppression of the breast, &c. The physical powers and feelings are affected often materially by the change from winter to spring, and many are in the practice of being bled, or taking cathartics. They may, by the advice of a physician, be sometimes useful, but they should never be practised as a habit. Exercise is particularly useful at this season; friction of the skin, comfortable and suitable clothing, will often prevent what is termed the "spring fever." Another thing, the more you give way to the feeling of low spirits or languor, the more power they gain over you. Go forth into the beautiful sunshine, and along the pleasant places where God has scattered His glories so bountifully, walk with a swift step, and breathe with delight the pure and balmy air of spring, and let the new sweet sights and sounds of nature leave their invigorating and healthful influence upon the soul and frame.

### FRESH AIR.

It is not in the power of all to command equal advantages in this respect, but clean apartments, and the free admission of air at suitable times, are very necessary in promoting health and cheerfulness. Exposure to currents of air at any time, especially when the body is heated, sudden transitions from heat to cold, or from cold to heat, sleeping in damp rooms, damp linen, &c., are causes of cold, and therefore highly deleterious.

### UNWHOLESOME DIET.

A precaution on this subject is a word to the wise, and, if heeded, will prevent the train of ills to which it gives birth. Those who have delicate, or dyspeptic stomachs, must be, in this respect, self-denying. When they have once suffered from any food that is indigestible, they should practise abstinence. Experience is the best teacher; still, a few articles may be specified as unsafe. Crude vegetables, hard-boiled eggs, oily substances, fresh fish, salt-dried meats, made dishes; in short, every

thing that creates acidity should be carefully avoided. Animal food, if of a digestible and mild quality, may be used, though meat suppers are injurious.

### CLOTHING.

Under all circumstances there should be an adaptation to the state and condition of the weather. But when the digestive organs are deranged, or in cases of debility, it is of great importance to maintain a due action of the skin. The clothing should be suited to this purpose, warm, but not heavy, and that worn next the skin should be flannel, summer and winter, though of a lighter texture in summer. Following these directions a worn and frail physical nature will endure much longer the inclemencies of our changing and variable climate. The dress, too, should fit, without fettering the body. Faintings, fits, and death may be caused by tight-dressing. It stops or impedes circulation, and is ONE of the primary causes of bad health and broken constitutions.

### RULES FOR THE PROMOTION OF HEALTH.

Rise early, and never sit up late, if it can be avoided. Wash the body every morning, and rub it dry with a rough towel, or else use friction ten or fifteen minutes with a flesh brush. Drink no spirits, wine, or fermented liquors, unless prescribed by a physician. Sleep in a room that has free access to the open air. Keep the head cool by bathing it every morning with cold water, and abate feverish and inflammatory symptoms by perseering stillness. Correct symptoms of plethora and indigestion, by eating and drinking less for a few days. Never eat a hearty supper of animal food. Never let a candle or lamp smoke after it is extinguished. Air your churches, houses, and rooms. Let no decaying substances, animal or vegetable, remain in your cellars or about your dwellings. Be cheerful, and never allow yourself to lose SELF-POSSESSION, for an UNHAPPY state of the mind will produce a corresponding UNHEALTHINESS of the body.

### EXERCISE.

There is no kind of exercise more beneficial than walking, as it gives a general action to the muscles of

the body, but for valetudinarians riding on horseback, or in a carriage, is preferable. Travelling for health does more for the feeble often than medicine. The feeble should never exercise immediately after meals; it often produces heart-burn, eructations, and vomiting; or if not, retards the regular digestion of food. Reading aloud is a healthy exercise for the lungs; to speak very loud, or to exercise the voice immediately after a meal, is hurtful to the lungs, as well as to the organs of digestion. Singing, in a remarkable degree, promotes the circulation of the blood. Sedentary artificers and mechanics, who sing at their work, contribute much to the preservation of their health.

### FRICTION.

One of the most gentle and useful kinds of exercise is, friction of the body with a piece of flannel or a flesh brush. This was in great esteem among the ancients, and is so at present in the East Indies. The whole body may be subjected to this mild, healthful operation, but the spine, the bowels, &c., should be most carefully attended to. Friction clears the skin, resolves stagnating humors, promotes perspiration, strengthens the fibres, and increases the warmth and energy of the whole body. For any one who has not leisure to take sufficient exercise it is an excellent substitute, and highly important. For palsy, rheumatism, indigestion, it is an excellent remedy. It may be performed in bed at night, or in the morning before rising, and should be continued some minutes at a time.

### BATHING.

The tepid bath seems the best adapted to the purposes of cleanliness and healthy exercise. To delicate females and young children it is of primary importance; at any rate, frequent ablutions should be practised, and the skin rubbed dry. The feet should be bathed as often as once or twice a week. This is a LUXURY, as well as a promoter of health.

### TO PRESERVE THE EYE-SIGHT.

Never sit long at a time in perfect darkness, nor exposed to a blaze of light. Sudden transitions are not

good. Avoid reading small print, or straining the eyes by looking at minute objects. If the eyes are disordered, do not read by candle-light, nor at dusk. Never gaze on glaring objects; nor allow too much light in your sleeping apartment. The furniture, drapery, &c., should not be altogether white; and if the eyes are weak, there will be much advantage in having green for the prevailing color in your room. The short-sighted should accustom themselves to holding their book as far off as possible, and the long-sighted as near as may be. Bathing the head, eyes, face and neck, in cold water every morning, strengthens the eyes, and is an excellent practice.

### TO PRESERVE THE TEETH.

To wash the mouth is serviceable, not only to keep the teeth clean, and thus to prevent decay, but in strengthening the gums, and making them adhere firmly to the teeth, which is of great importance in preserving them sound and secure. Use a brush mornings, and, when powder is necessary, the prepared chalk alone is good; or, if the gums are becoming spongy, a mixture of Peruvian bark with it is better. If tartar accumulates on the teeth, apply to a dentist.

### HAIR.

If the head is dry and feverish, and the hair husky, oil it occasionally, it will preserve it in a more healthy condition, and prevent its becoming gray. If, on the contrary, there is too much moisture and oil on the hair, and it comes out, wash the head with soap and water, and wet in brandy occasionally to strengthen the roots. Macassor oil is also good to strengthen the roots—made as follows: Take three quarts of common oil, half a pint of spirits of wine, three ounces of bergamot; heat them together, and, when removed from the fire, add four small pieces of alkanet root, and keep it covered closely several hours, then strain, and it is ready for use. Palma Christe oil, scented, brushed into the hair twice a day two or three months, promotes its growth, and is said to be valuable in making it luxuriant.

### TO PREVENT THE SPREADING OF CONTAGION.

It cannot be too widely known that nitrous acid possesses the properties of destroying the contagion of typhus fevers and other malignant diseases. By the following simple process the gas may be procured with but little expense and trouble. Place a little saltpetre on a saucer, and pour on it as much oil of vitrol as will just cover it; a copious discharge of acid gas will instantly take place. The quantity may be regulated by the ingredients. This is very important in preserving health and preventing the spread of contagion.

## CHAPTER V.

### USEFUL HINTS AND ITEMS FOR HOUSE-KEEPERS.

Do every thing in its proper time. Keep every thing in its place. Mend clothes before washing, except stockings, they are best darned when clean. Wash all colored garments with hard soap, and do it as quick as possible. Flannels should be washed in hot suds, and rinsed in clean, soft, boiling water; to stand until cool enough to wring out, and they will not turn yellow nor shrink. A little bluing improves them.

Alum or vinegar is good to set the colors of red, green, and yellow; salt is good for blue. Before you wash, dip blues in salt and water, use alum after. If table cloths are stained with tea, coffee, or fruit, turn on them boiling water, and let them stand till the water is cold, or the color will never come out. Starch all kinds of calico, but black; use potato water for black, as that will not show. If there are many in a family that wear black, save the water when potatoes are boiled, for this purpose.

Sal Soda will bleach clothes very white, but used in large quantities is thought to injure the texture. One spoonful is enough to put in a kettle when you boil. It can be found at druggists; in the country, at other stores for 8 or 10 cents per pound.

Save all your suds for gardens and plants, or to harden cellars and yards when sandy.

Poland and flour starch should be first wet with a little cold water and stirred smooth, then pour on boiling water gradually, stirring it constantly, and then boil a few moments. Stir Poland, or muslin starch, with a spermaceti or tallow candle, and it will not stick to the iron, and will be very smooth and much nicer.

Count your clothes pins, spoons, knives and forks, towels, handkerchiefs, &c., every week.

Never pour boiling water on tea trays; wash them with cool suds, and polish with a little flour and dry cloth when dry. If made of paper, use a flannel, with a little sweet oil to rub on the spots; then rub with a dry cloth or old silk handkerchief.

Frozen potatoes will yield more starch, or flour, than fresh ones; it makes nice cake. Some families provide it simply for this purpose. Take a coarse tin grater, full of coarse holes, and grate a bushel or two; wash the pulp through a sieve over a tub; when you have done it in several waters until the starch is out, then let it settle in the tub and pour off the water. Repeat this, stirring it well when a new water is added, until the water looks clear. It is then fit for use as starch or flour, after it is dried carefully.

Indian and rye meal should be stirred and kept in a cool place in summer, or they will become sour.

Save all your pieces of bread for puddings; dry them well or they will mould.

Examine your pickles, sweetmeats, and every thing put away to keep, that nothing be lost for want of care.

If you buy your cheese, never get a large quantity at a time, especially in summer. Get your butter put up by some good family in the fall, for winter use, and in the summer engage it fresh every too weeks at least.

A hot shovel on a warming pan of coals, held over varnished furniture, will take out white spots. The place should be rubbed, while warm, with flannel.

Skim milk and water, with a bit of glue dissolved and hot, is good to restore rusty black Italian crape. It should be clapped and pulled dry, and it will look as well as new.

Bibbands of any color, should be washed in cold soap-suds and not rinsed. Iron them wet, and they will be stiff and nice as new, except some kinds of pink and blue, which will fade. These may be dyed to look as well as ever. Dip the blue in a little cold blue ink and water, and the pink in carmine, from a pink saucer, according to directions, and they will be perfectly restored.

Marble fire places should not be washed with suds, it will in time destroy the polish. After the dust is wiped off, rub the spots with a nice oiled cloth, then rub dry with a soft rag.

When you rub the knobs of your doors, use a piece of paste board as large as your two hands, with a small hole large enough to just encircle the knob in the centre, and a slit in the paper to let it in. This slipped on, will keep off all soil from the paint, and is a nice way of doing it.

If your flat irons are rough, or smoky, lay a little fine salt on a flat surface, and rub them well; it will prevent them from sticking to anything starched, and make them smooth.

Rub your griddle with fine salt, before you grease it, and your cakes will not stick. When walnuts have been kept until the meat is too much dried to be good, let then stand in milk and water eight hours, and dry them, and they will be fresh as when new.

It is a good plan to keep your different kinds of pieces, tape, thread, &c., in separate bags, and there is no time lost in looking for them.

The water in flower pots should be changed every day in summer, or it will become offensive and unhealthy, even if there is salt in them.

Hops should be picked when they are full grown and begin to be fragrant; by no means let them remain longer, as a strong wind or rain will injure them greatly. Spread them awhile to dry.

Oat straw is best for the filling of beds, and it is well to change it as often as once in a year.

Cedar chests are best to keep flannels and clothes, as moths never are found in them. Red cedar chips are good

to keep in drawers, wardrobes, closets, trunks, &c., to keep out moths.

When clothes have acquired an unpleasant odour by being from the air, charcoal, laid in the folds, will remove it soon.

If black dresses have stains upon them, boil a handful of fig leaves in a quart of water, and reduce it to a pint, and a sponge dipped in this liquid and rubbed upon them, will entirely remove stains from crape, bombazines, &c.

In laying up furs for summer, lay a tallow candle in or near them, and all danger of worms will be obviated.

If you wish to select a carpet for durability, always choose a small figure, as they are the best cloth, and will do best service.

Silver-plated candlesticks should be cleaned by pouring on the tops boiling hot water, to remove the grease; when wiped dry, use whiting, rubbing them until bright. It does not not injure plated ware at all. If sockets are too large for the candle, wind the end with a paper, but it should not be in sight. Always light them, to burn off the cotton, before setting them up, but leave them long enough to light with ease.

Charcoal should never be used in sleeping rooms, unless in a grate; it is very deleterious, and frequently destroys life. If used in a furnace, let it be where there is air. It is very hurtful in a close room.

Wrap a wet sheet or blanket around you if obliged to expose your person in time of fire.

If the clothes catch fire, smother it instantly; put on a blanket, cloak, shawl, anything near; if away from any articles of the kind, take the clothes from the skirts, and if around the shoulders, draw them over and hold them fast; if at the lower garments, sit upon them, ANY WAY TO SMOTHER IT QUICK.

A bit of soap rubbed on the hinges of a door will prevent their creaking.

Scotch snuff put on the holes where crickets come out, will destroy them.

Wood ashes and common salt, wet with water, will

stop the cracks of a stove, and prevent the smoke from penetrating.

The bed hangings and window drapery in nurseries and common rooms should be of those colors that are easiest to the eyes. Green should be the prevailing color. A damp mop, passed under a bed to wipe off the dust as often as once a week, will prevent the visits of the nightly foe.

Carpets should be shook often, but with care. It is a good plan to hang them on a line, and take a new broom and beat and sweep them, after they have been shook awhile. This brings out the dust from the threads.

Silver spoons should never be used in the kitchen, unless for preparing preserves.

If you wish to have your free-stone hearths dark, wash them with suds; oil is good to rub in occasionally, and it will not show spots. If you wish to have it look like new, get free-stone powder of the cutters, and rub on wet, and when dry rub it off.

Sour beer may be converted into good vinegar by putting into it a pint of molasses and water, and in two or three days after half a pint of vinegar; in ten days it will be first rate vinegar.

Ox gall is good to set colors; one table-spoonful in a gallon of water is sufficient. It should be used without soap, and stirred well into the water. If you wash it afterwards use sand, and not rub soap on the cloth.

Attend to mending the clothes of a family at least once a week. Stockings must be attended to, the heels lined or run, and thin places and holes well darned.

In winter, set the handle of your pump high as possible at night. When the weather is most severe, throw a rug or blanket over it, or it will freeze.

Have a heavy stone on the top of your pork, and see that it is kept under the brine. It is a good place to keep fresh meat in the summer, to keep from spoiling. Always have a plenty of clean dish water, and put it on as soon as the meat is prepared, as an INVARIABLE RULE. No good housekeeper will allow this rule to be broken.

Never use lye to clean tin, it will spoil it soon; make

it clean with suds, and rub with whiting, and it will look well, and last much longer.

Never lay knives in hot water, it injures the handles and destroys the polish.

Keep your mustard-spoon clean, and your salt-spoons out of the salt.

Keep the cruets of your castor clean, well filled, and a piece of green baize or flannel under them.

A gallon of strong lye put in a tub of water will make it soft as rain water. It is a good plan to provide this, when you have not a plenty of rain water, for dishes, &c.

Keep mats at your door, and wash them often. Always have the steps and entrance to your house clean. Keep a house cloth, and a carpet broom.

Never clean gilded frames; many, in doing this, have ruined them. Several coats of white varnish is good to preserve them, or they may be covered.

It is said that the half of a cranberry bound on a corn, will eradicate it in the course of a few nights.

If you dry pumpkin, stew it first, dry it down well, and do up in small cakes, and dry in an oven a little warm.

Never sit chairs to hit the paper or paint on walls. It soon soils them, and injures the chairs.

Keep your brass bright, your windows clear, and furniture dusted.

## CHOICE OF MEATS.

Beef. When it is young, it will have a fine smooth open grain, be a good red, and feel tender. The fat should be white, rather than yellow; when that is of a deep color, the meat is seldom good. When fed with oil cakes, it is usually so, and the flesh is flabby.

Pork. If the rind is tough and thick, it is old. A thin rind is always preferable. When fresh, the meat will be smooth and cool; if clammy, it is tainted.

Mutton. Choose this by its fine grain, good color, and white fat.

Lamb. If it has a green or yellow cast, it is stale.

Veal. The whitest is the most juicy, and therefore preferable.

Bacon. If the rind is thin, the fat firm, and of a red tinge, the lean of a good color, and adhering to the bone, it is good, and not old.

Hams. Stick a sharp knife under the bone; if it comes out clean, with a pleasant smell, it is good; but if the knife is daubed, and has a bad scent, do not buy it,

## CHOICE OF FOWLS.

Turkeys. If young, the legs will be black and smooth, the eyes lively, and the feet pliable. If old, the eyes will be sunk and the feet dry.

Geese. If young, the bill will be yellow, and the feet limber. If old, the bill and feet will be red and dry.

Hens. If their comb and legs are rough, they are old; if smooth and limber, they are young.

Wild and Tame Ducks. If young, they will be limber-footed; if fat, hard and thick on the lower part of the body. A wild duck has red feet, and smaller than tame ones.

Partridges. If young, will have a black bill and yellow legs; if old, the bill will be white and the legs blue. Old fowls, tame and wild, may be told by their hard, rough, or dry feet.

Hares and Rabbits. If young, they will be white and stiff, the ears will tear like brown paper. If old, the flesh will be dark, the body limber, and the ears tough. A rabbit, if old, will be limber and flimsy; if young, white and stiff.

## CHOICE OF FISH.

Cod. The gills should be very red, the fish thick at the neck, the flesh white and firm, and the eyes fresh. When flabby, they are not good.

Salmon. If new, the flesh is of a fine red, the gills particularly, the scales bright, and the whole fish stiff.

Shad. If good, are white and thick, gills red, and eyes bright, the fish stiff and firm. Season, April and May.

Mackerel. Their season is May, June, and July. They are so tender they do not carry or keep as well as other fish unsalted.

Striped Bass. If the eyes are sunken, and gills pale, they have been from the water too long. Their fineness depends upon their being cooked immediately after they are killed.

Trout. These should be killed and dressed as soon as caught. When you buy them, see that the gills are red, and hard to open, the eyes bright, and the body stiff The season, July, August, and September.

Flounders soon become flabby and bad; they should be thick and firm, the eyes bright.

Lobsters, if they have not been too long taken, the claws will have a strong motion, if you press your finger on the eyes. The heaviest are the best. The male, though generally smaller, has the highest flavor, the firmest flesh, and the deepest red. It may be known from the female by having a narrower tail.

Crabs. Those of middling size are the sweetest. The heaviest are best. When in perfection, the joints of the legs are stiff, and the body has an agreeable smell. The eyes look loose and dead when stale.

All fish should be well dressed and clean. Nothing is more unpalatable than fresh fish not thoroughly cooked.

Fresh Fish, when boiled, should be placed in cold, and shell fish in boiling water.

Fish should be garnished with horseradish, or hard boiled eggs cut in rings, and laid around the dish, or pastry, and served with no other vegetable but potatoes. This, or soup, is generally eaten at the commencement of a dinner.

### TO KEEP OYSTERS.

After washing them, lay them in a tub, with the deep part of the shell undermost, sprinkle them with salt and Indian meal, or flour, and fill the tub with cold water, and set in a cool place. Change the water daily, and they will keep fresh a fortnight.

### RULES AND SUGGESTIONS.

If meat or fish has acquired a slight unpleasant flavor, or does not smell perfectly fresh, when prepared to boil, add a tea-spoonful of saleratus, and, unless it is bad, it will

remove every thing unpleasant in taste and smell. If the brine of meat or fish begins to have an unpleasant smell, scald and skim it, adding to it a spoonful or two of saleratus, pepper and cinnamon, or throw it away and make new with the above ingredients.

Baking meats is easily done, and is a nice way of dressing a dinner, but a lean thin piece should never be used in this manner, it will all shrivel away.

The most economical way of cooking fresh meat, is to boil it, if the liquid is used, as it always may be, for soups or broths.

It takes fat meat longer than lean to bake. All fresh meat should be kept awhile to make it tender.

In baking any kind of meats or puddings, if a stove is used, they will bear more fire at first than when they are nearly done.

In cooking by a fire-place, cooks impose on themselves discomfort, and incur a great waste in fuel, by making too much fire. Often, in summer, a fire is made like a small furnace to boil a pot. Three small sticks of wood, or two, with chips, are sufficient at a time, if the pot or kettle is hung low, and but little inconvenience is felt from the fire. If you use a tin baker, the upper part or lid is sufficient to bake meats of almost any kind, if bright. Mutton, veal, pork, beef, &c., have been well cooked in this simple way. Set the dripping pan on a few coals, with a small quantity of water, with merely the cover over it, and it will be done in the same time with less fire, less trouble, and no drawing out of smoke. Puddings may be done in the same way, and also custards.

When a pig is baked, it has a nice crisp to rub it over well with butter. It is better than oil, on account of the salt.

## REGULATION IN TIME OF COOKING.

### BOILING.

The first caution is, that whatever is used for boiling must be perfectly clean. The second, keep it constantly boiling. Salt meat may be put into cold, and fresh into hot water. If a scum rises upon the surface, it must be skim-

med off or it will discolor the meat. Never crowd the pot with meat, but leave room for plenty of water. Allow a quarter of an hour for every pound of meat. An old fowl will need boiling three or four hours. A full grown one an hour and a half. A pullet nearly an hour. A chicken about half an hour.

### ROASTING.

Beef. A large roasting piece will bake in four hours, a smaller one in three or three and a half.

Mutton. A leg, or saddle, will require two hours and a half each. A shoulder, loin, neck, and heart, will each need an hour and a half or three quarters.

Veal. A fillet, which is the thick part of the hind quarter, will require four or five hours. A loin, or shoulder, from three to three and a half. A neck, or breast, nearly two hours.

Lamb. A hind-quarter of lamb is generally cooked whole, and requires nearly two hours. A fore-quarter, two hours. A leg nearly an hour and a half. A shoulder and breast, one hour.

Pork. A leg will require nearly three hours. A thick spare rib, two hours or more; a thin one, an hour and a quarter or half. A loin will bake in two hours or more. A pig, three or four weeks old, will require but about an hour and a half.

Venison. A large haunch will require four hours and a half; a smaller one, about three hours.

### POULTRY.

Turkey. The largest size will require three hours; a smaller one, two hours; the least size, an hour and a half.

Goose. A full grown goose will require nearly two hours; but a young one will roast in an hour.

Duck. The largest will bake in less than an hour; the smaller ones in half an hour. Pricking with a fork will determine you, whether done or not. Fowls should be well done through, and all meats but beef; this is generally preferred rare done.

## COOKING FISH, SOUPS, MEATS, ETC.

### BAKED SHAD.

In the first place make a stuffing of the head and cold boiled ham, seasoned with pepper, salt, cloves, and sweet majoram, moisten it with beaten yolk of an egg. Stuff the fish, rub the outside with the yolk of egg, and some of the stuffing. Lay the fish in a deep pan, putting its tail to its mouth. Pour in the pan a little water, a piece of butter rolled in flour. Bake two hours, pour the gravy round it, garnish with lemon sliced, and send to table. Any fish may be baked in this way.

### TO BOIL SHAD AND OTHER FISH.

Split, wash, and dry in a cloth. Season with salt and pepper. Grease the gridiron, lay the fish, the outside uppermost, over coals, and broil a quarter of an hour or more. Butter it well, season with pepper and salt; send to table hot.

### STURGEON CUTLETS OR STEAKS.

Take off the skin, cut from the tail-piece slices half an inch thick, rub them with salt, and broil over a hot fire. Butter, and sprinkle on them Cayenne pepper. Or first dip them in beaten yolk of egg and bread crumbs, and wrap them up in buttered papers, and broil over a clear fire. Send to the table without the papers.

### TO BOIL FRESH SALMON.

Scale and clean, cutting open no more than is necessary. Place it in a kettle of cold water, with a handful of salt. Let it boil slowly, but it should be well cooked, about a quarter of an hour to a pound of fish. Skim it well, and as soon as done, lift it carefully into a napkin to absorb the moisture, and wrap it close. Send to table on a hot dish, garnish with horseradish and curled parsely, or boiled eggs cut in rings, laid round the dish. Oyster sauce is best with fresh boiled fish.

### SMOKED SALMON.

Clean and scale, cut the fish up the back, take out the roe and the bone neatly. Rub inside and out, with equal parts of Havana sugar, add salt, and a little saltpetre. Press the fish flat with a board and weights on it, two days. Drain

from the salt, wipe it, and stretch it open, and fasten with a pin or stick. Then hang up, and smoke over a wood fire five or six days. When used, soak the slices in luke-warm water, and broil for breakfast.

### LOBSTERS AND CRABS.

Put them in boiling water with a handful of salt. Boil half an hour or an hour in proportion to its size. If boiled too long, the meat will be hard and stringy. When done, wipe dry and take off the shell, and take out the blue veins, and what is called the lady-fingers, as they are unwholesome and not to be eaten. Send it to table cold with the body and tail split open, and the claws taken off. Lay the large claws next the body, the small ones outside; garnish with double parsely.

### TO DRESS LOBSTERS COLD.

Take the fish out of the shell, divide it in small pieces, mash up the scarlet meat and prepare a salad mixture of Cayenne pepper, salt, sweet oil, venegar and mustard; mix the lobster with this preparation together and serve in a dish.

### CLAMS.

Wash them clean with a cloth, and rinse them, put them in a cooking vessel with a small quantity of water, and boil them until the shells open, then take out the clams and remove the shells. Cook them in the same water, adding salt, pepper, and a good quantity of butter. Roll crackers, and when done stir them in. Toast a few slices of bread to lay in the tureen, and pour over the clams. Send to the table hot.

### CLAM CRIDDLES.

Make a wheat batter in the usual way, chop the clams fine and stir in. Bake in the common way. A nice breakfast dish.

### TO FRY OYSTERS.

Make a batter, wipe the oysters dry, dip them in the batter, and roll them in crumbs of bread and mace, finely powdered, and fry in butter.

### OYSTER PATTIES.

Stew some large oysters with a little nutmeg, a few cloves, some yolk of egg boiled hard, and grated, a little butter and

as much of the oyster liquor as will cover them; when stewed a few moments, take them out of the pan to cool. Have shells of puff paste previously baked in small patty pans, and lay two or three oysters in each.

### CODFISH CAKES.

Soak codfish over night, and scald it, add to it twice its quantity of boiled potatoes, knead all well together, make in small cakes, and fry in butter. If, after having boiled codfish, you have some left, use it in the same way. It makes a nice and wholesome dish.

### FOR BROILING CHICKENS.

Separate the breast from the back, beat them flat, as you would steak, lay the under side to the fire until it is above half done. Cover them over with a square tin, or other convenient covering, and they will be done through much sooner. Great care should be taken not to let the flesh side burn, but they should be of a fine brown color. When the different parts of the chicken are done, turn over them some melted butter, with a little salt and pepper.

### TO BROIL A STEAK.

Pound it well, striking it with the edge to cut the fibres, when sufficiently thin and tender, lay it upon the gridiron, and cook it over hot coals, turning it often; when the blood settles upon the top, hold the platter near, and take it carefully on that it may not be lost; let the steak lie upon the platter until every thing is in readiness, though not over a minute, then lay it back on a few fresh coals until done. Have butter melted, and, when the steak is on the platter, pepper and salt it, and pour over the butter, and take it on hot. The meat should not be pressed to obtain the blood, it makes the meat dry, and greatly impairs its richness. It should not be commenced until everything is ready. It requires constant attention.

### TO FRY HAM.

Cut a ham through the middle, and then you get the fat and lean in good proportions; lay it in your pan or spider, and cover it that it may cook tender in the steam. When nearly done, let it finish open that the steam may evaporate, and that it may slightly brown.

### TO ROAST PORK.

When you roast that which has the skin on, take a sharp knife, and cut it through the rind, that it may crisp well. If a leg, cut a hole under the twist, and stuff it with chopped bread, seasoned with pepper, salt, and sage, and skewer it up. Roast it crisp, and handsomely brown. Make a drawn gravy of the dripping, and serve it with apple-sauce. This is called mock-goose. The spare-rib should be sprinkled with flour, and pepper, and a little salt, and turned often, until nearly done; then let the round side lie up until nicely brown. Make the gravy of the dripping, prepared with flour, and seasoned well with salt. Never send it to the table without apple-sauce, sallad, pickles, or slaw. Pork must be well done. To every pound allow a quarter of an hour. For example, twelve pounds will require three hours. If it be a thin piece of that weight, two hours will roast it.

### TO ROAST VEAL.

If the leg is used, it may be stuffed like pork, and requires nearly as much time to bake. It should be done a fine brown, and often basted.

### TO ROAST BEEF.

Never salt fresh beef before you cook it in any way, for it draws out the gravy, and leaves the meat dry. If the roasting-piece is large, bake it three hours, otherwise two and a half. Make your gravy of the dripping.

### TO ROAST A PIG.

When well dressed and washed, prepare a stuffing of chopped bread, seasoned well with pepper, salt, sage, and butter, soaked enough to make it soft. Fill the body, and sew it up with strong thread. Flour it well all over, and when the oven is well heated through, put it on dripping pans that will catch all the gravy. Let it stand in two or three hours, according to the size of the pig. Let it be well crisped, and of course handsomely brown. When you take it from the oven, mash two spoonsful of flour, with butter enough to mix well, and dip on the dripping a little at a time at first until melted, then pour it on, stirring it until thickened, season it well with salt, and add to it the brains bruised fine, and then send it to the table. The head must be cut off, and laid upon the platter.

### TO ROAST GEESE AND DUCKS.

See to it that they are well dressed, and then boil them an hour or more, according to their age. When they begin to feel tender take them out, and having your stuffing prepared, of bread, salt, pepper, and butter—some like sage, —made soft, fill the body, and fasten it up with thread. Roast them brown. Make your gravy of the dripping; serve both with apple-sauce. Poultry, when roasted or boiled, should have the wings and legs fastened close to the body, with a cord tied around.

### TO ROAST A TURKEY.

Prepare the stuffing with bread, salt, pepper, butter, cinnamon, or nutmeg, or a little lemon peel, or parsley and thyme, chop and mix all well together with one or two eggs beat well. With this dressing stuff the body and the breast, and sew them with a strong thread. Roast the turkey of a fine brown, not burning it. It will be well done in one hour and a half, or, if old and very large, two hours or more. Make a gravy of drawn butter and the dripping. Another sauce is made of half a pint of oysters boiled in a pan, thickened with a lump of butter rolled in flour. Only let it boil once. Serve this by itself, in connection with other gravy, for every person does not like oyster sauce.

### TO ROAST SNIPES OR WOODCOCKS.

Flour and baste them until done. Have ready a slice or two of bread, toasted and dipped in the dripping, to lay on the dish. Lay them on the toast. Make a gravy of butter and flour mashed, with the dripping poured on and stirred until scalded.

### TO BOIL A DUCK OR RABBIT.

Use a good deal of water, and skim it as often as anything rises. Half an hour will boil them. Make a gravy of sweet cream, butter, and flour, a little parsley chopped small, pepper and salt, and stew until done, and lay them in a dish, and pour the gravy over them.

### TO BOIL A TONGUE.

Put a tongue into a pot over night and soak, until three hours before dinner, then boil until noon

### TO BOIL A LEG OF LAMB, MUTTON, OR VEAL.

Let the water boil before any fresh meat is put in, that the richness of the meat may not be lost. Boil a piece of pork with either of the above, but not with vegetables; when done, make a gravy with drawn butter.

### MUTTON CHOPS.

Take pieces of mutton that are not good for steak, rib or other pieces, have them cut small, and boil them in water sufficient to cook them tender; add salt, pepper, and, if not fat enough to make good gravy, add a little butter; or, if preferred, cut a little pork fine and boil with the meat, which will make it nearly salt enough, and sufficient gravy; let them fry, after the water is out, a little brown.

### FRICASEED BEEF.

Take any piece of beef from the fore-quarter, such as is generally used for corning, and cook it tender in just water sufficient to have it all evaporate in cooking. When about half done, put in salt enough to just season it well, and half a teaspoonful of pepper. If the water should not be done out soon enough, turn it off and let it fry fifteen minutes, turning it often; and it is even better than the best roast beef. Make your gravy of the dripping. Take one or two table-spoonsful of flour, and add first the fat; when mixed, pour on the hot juice of the meat or hot water from the tea-kettle, and your gravy will be nice. Serve with vegetables, and sallad, or apple-sauce.

### VEAL CUTLET.

Cut your veal as if for steak or frying, put clean nice lard or butter in your pan, and let it be hot. Beat up an egg on a plate, and have flour on another; dip the pieces first in the egg, then in the flour on both sides, and lay in the pan and fry until done, turning it carefully once. This makes an excellent dish, if well prepared. This way is superior to batter.

### TO FRY PORK.

If too salt, freshen by heating it in water after it is cut in slices. Then pour off the water and fry until done. Take out the pork, and stir a spoonful of flour into the lard, and turn in milk or cream enough to thicken. This makes a more delicate gravy, and is very palatable.

### TO FRICASEE A CHICKEN.

Cut it in pieces, jointing it well, and boil it tender with a slice or two of pork cut fine. When nearly done, add half a tea-spoonful of pepper and salt to just season it. When tender, turn off the water and add half a pound of butter or nearly that, and let it fry a while. Then take out the chicken, and stir in two or three spoonsful of flour previously dissolved in cold water, and add the water from the chicken. Let it boil, and pour it upon the chicken on the platter. This makes a superior dish, and needs no vegetables but mashed potatoes.

### HAM SANDWICHES.

Slightly spread thin slices of bread; if you choose, spread on a very little mustard. Lay very thin slices of boiled ham between; tongue, sliced or grated, may be used instead. Lay them on plates, to be used at suppers.

### HEAD-CHEESE.

Take the heads, tongues, and feet, and other pieces if you choose. Make them clean and soak them. Then boil until they will slip from the bones easily. Chop and season with salt, black pepper, cloves, sage or sweet marjoram rubbed fine. Mix well and place it in a pan; set a plate on the top with a weight upon it. In two days it will be cold and fit for use. Turn it out and cut it in slices for tea, or suppers.

### MOCK DUCK.

Take a steak about as large as a breakfast plate, beat it out, and fill it with a bread stuffing prepared as for a turkey, and sew it up. Fry one hour in the dripping from roast beef or butter. Turn it and keep it covered until near done. When you take it up, turn in half a cup of hot water in the gravy that has been previously seasoned, and pour over. It will be thickened with the stuffing that falls from it.

### RICE BALLS.

Take the waste pieces of steak, or baked meat, chop fine and season with salt, pepper, cloves, or cinnamon. Wash rice and mix with it, then tie up in cloths to shape balls, and boil half an hour, and serve with drawn butter.

### FRENCH ROLLS.

Cut strips of beefsteak to make a roll as long as a knife

blade, and larger than a sausage, stuff with a prepared stuffing, and sew up and bake, or fry in batter. Melt butter for a gravy.

### CHICKENS BOILED

The wings and legs of fowls should be fastened to the body by a cord tied around to keep them in place, instead of skewers. When thus prepared, let them lie in skim-milk two hours. Then put them in cold water, cover them, and boil over a slow fire. Skim the water clean. Serve with white sauce, or drawn butter.

### BOUILLI.

Boil seven or eight pounds of beef in more water than enough to cover it. Remove the scum as it rises, then put in two carrots, two turnips, two onions, two heads of celery, two or three cloves, a faggot of parsley and sweet herbs. Let it boil gently four or five hours. Put a carrot, a turnip, an onion, and a head of celery in to cook whole, and take them out when done and cut in small squares. Take out the meat carefully, skim off the fat, and lay the sliced vegetables into the soup, and add a spoonful of ketchup to heighten the flavor. Pour in a soup tureen, and serve as other soup.

### MOCK TURTLE SOUP.

Boil a calf's head, a knuckle of veal, a piece of ham six or eight hours. Reserve a part of the veal for force meat balls to be added. Skim it carefully, and when the scum ceases to rise, season with salt, pepper, cloves, and mace; add onions and sweet herbs, and six sliced potatoes; stew gently half an hour. Just before you take it up, add a half pint of white wine. Make balls about the size of half an egg, boil part, and fry the remainder; put in a dish by themselves. For these take lean veal, pork, and brains, chop fine, and season with salt, pepper, or cloves, mace, sweet herbs, curry powder, with the yolk of an egg to hold it together.

### MACARONI SOUP.

Make a nice veal soup, seasoned with sweet marjoram, parsley, salt, pepper, mace, and two or three onions. Break in small pieces a quarter of a pound of macaroni, and simmer in milk and water till swelled and tender. Strain and add to the soup. To the milk, add half a pint of cream

thicken it with two spoonsful of flour, and stir gradually into the soup, and boil a few moments before serving.

### VERMICELLI SOUP.

Make a rich soup of veal, mutton, or fowls—old fowls that are not good for other purposes will do for soup. A few slices of ham will be an addition. Season with salt, butter, two onions sliced, sweet herbs, a head of selery cut small. Boil until the meat falls to pieces. Strain it, add a quarter of a pound of vermicelli which has been scalded in boiling water. Season to your taste with salt and Cayenne pepper, and let it boil five minutes. Lay two slices of bread in your tureen and pour the soup upon it.

### TO BOIL A HAM.

Soak, according to its age, twelve or twenty-four hours. Have it more than covered with cold water, and let it simmer two or three hours, and then boil an hour and a half or two hours; skim it carefully. When done, take it up and skin it neatly, dress it with cloves and spots of pepper laid on accurately. You may cut writing or tissue paper in fringe and twist around the shank bone if you like. It should be cut past the centre, nearest the hock, in very thin slices.

### FINE SAUSAGES.

Have two-thirds lean and one-third fat pork, chop very fine. Season with nine tea-spoonsful of pepper, nine of salt, three of powdered sage, to every pound of meat. Add to every pan full, half a cup of sugar. Warm the meat, that you can mix it well with your hands; do up a part in small patties, with a little flour mixed with them, and the rest pack in jars. When used, do it up in small cakes and flour on the outside, and fry in butter or alone. They should not be covered or they will fall to pieces. A little cinnamon to a part of them will be a pleasant addition; the sugar is a great improvement. They should be kept where it is cool but not damp. They are very nice for breakfast.

### TO BROIL HAM.

Cut the pieces in thin slices, soak them in hot water fifteen or twenty minutes. Dry them in a cloth and lay them on a hot gridiron, and broil a few moments. Butter and season with a little pepper. Cold boiled ham is better to

broil than raw, and will require no soaking. If you wish to serve fried eggs with it, do it according to the directions; lay one on each slice of ham, and send it to the table hot.

### PORK STEAK.

This should be broiled the same as beef, except it requires to be done slower and much longer. If there is too much fire, it will blaze. Cut in around the bone that there shall be nothing that has a raw appearance. Season with butter, salt and pepper. They may be cooked in cutlets like veal, with a little powdered sage and hard crumbs, or flour; fried in butter.

### A PORK STEW.

Take pieces of fresh pork, sweet bread, liver, heart, tongue, and skirts. Boil in just water enough to cook then tender. Before they are done, season them with salt and considerable pepper, and let them fry after the water is out to a fine brown. It is an excellent dish.

### TO ROAST A BEEF'S HEART.

Cut open, to remove the ventricles or pipes, soak in water to free it of blood, and parboil it about ten minutes. Prepare a highly seasoned stuffing and fill it. Tie a string around to secure it. Roast till tender. Add butter and flour to the gravy, and serve it up hot in a covered dish. Garnish it with cloves stuck in over it, and eat with jelly. They are good boiled tender and fried in butter, cut in thin slices, seasoned with salt and pepper.

### BEEF CAKES.

Chop pieces of roast beef very fine. Mix grated bread crumbs, chopped onions and parsley; season with pepper and salt; moisten with a little of the dripping or ketchup; cold ham or tongue may be added to improve it. Make in broad flat cakes, and spread a coat of mashed potatoe on the top and bottom of each. Lay a piece of butter on every cake and set in an oven to brown. Other cold meats may be prepared in the same way for a breakfast dish. Slices of cold roast beef may be broiled, seasoned with salt and pepper, and well buttered; served hot. They may be chopped fine, seasoned well, warmed with a little butter, dripping, or water, seasoned well with salt and pepper, and laid upon a moist toast for a breakfast dish.

### TO FRY CALVES' LIVER.

Cut the liver in thin slices, season with pepper, salt, and, if you like, sweet herbs and parsley. Dredge with flour, and fry brown in lard or drippings. Cook it well, and serve with its own gravy. A calf's heart may be dressed in this manner. Slices of cold boiled ham may be added as an improvement.

### PEA SOUP.

If you use dry peas, soak them over night in a warm place. Early next morning boil them an hour, adding a teaspoonful of saleratus ten minutes before you change the water. Then, with fresh water and a pound of salt pork, boil three or four hours, or until they are perfectly soft. Green peas require only about an hour.

### TO STEW BEEF.

Take a good piece of fresh beef, not too fat, rub with salt, and boil in water just enough to cover it. An hour before you take it up, add pared potatoes and parsnips, if you have them, split. Let them cook till tender, and turn the meat several times. Serve them up together with gravy. The water should be cooked out, which will leave the vegetables a light brown. Sweet potatoes are good cooked in this way.

### BOLOGNA SAUSAGES.

Boil fresh beef, chop it fine, and season it with Cayenne and black pepper and cloves; put it in cloth bags, and cut off for tea.

### FRESH MEAT BALLS.

Boil the liver, heart, tongue, &c., chop and season with drawn butter.

### TO MAKE SAUSAGES IN SUMMER.

Chop raw pork and veal fine, and season with salt, pepper, and sage; add a little flour, and do up in balls to fry, and they make a fine fresh dish, equal to those made entirely of pork.

### FRESH MEAT GRIDDLES.

Chop all the bits of cold fresh beef or veal, season with salt and pepper; make a griddle batter, and lay on a spoonful on the iron well buttered, to prevent its sticking, then a spoonful of the chopped meat, then a spoonful of batter

over the meat, and when cooked on one side then turn, and when done carry them on hot, and they are very nice.

### A BEEF OR VEAL PIE.

Take the cold pieces after baking, and make a light crust, like tea-biscuit, only a little shorter, lay the the crust around the dish, not on the bottom; then season your meat with salt and pepper, and butter between each layer; add water to make it moist with gravy, then lay on the cover, and bake three-quarters of an hour. It makes a fine dish occasionally.

### TO MAKE A POT-PIE.

Make your sponge as you would for biscuit, only shorter; when you do it up let it get just light, putting into the batter a little saleratus and salt; when light take it on to the board, and cut it in pieces like biscuit, only let them lie and rise without kneading them at all. When the meat is tender there should be enough water to come just over the meat. Season it well with salt and pepper, and dissolve flour in cold water, and stir in enough to thicken it well. If the meat is very lean put in butter, and when boiling hot lay the crust in over the surface and shut it up close, and not allow it to be opened again in half an hour, when it will be ready for the table, as light and nice as sponge.

### TO MAKE A SOUP.

Beef soup should be stewed four hours at least, over a moderate fire, with a handful of rice, and just water enough to keep it covered. An hour before it is done put in two or three common size onions, and ten or twelve common potatoes, pared and sliced, and a few carrots, if you like; at the same time put in salt to season it well, and half a teaspoonful of pepper. A little lemon-peel some like, cut in thin slices, others prefer powdered sage and parsley, or savory, two teaspoonsful. Stir up two or three eggs with milk and flour, and drop it in with a spoon. This makes a soup look nice; but bread broken into the tureen is preferable, with the soup taken over it. If you have other dishes, this should be the first for the table.

### ALAMODE BEEF.

Tie up a round of beef to keep in shape, make a stuffing of bread, as you would for a turkey, adding sweet herbs,

if you have them ; cut holes in the beef, and put in half the stuffing. Tie the beef up in a cloth, and just cover it with water, and let it boil an hour and a half or more ; then turn the liquor off, and let the beef brown over a slow fire ; turn it often. Then take it out and add a little water, and make the remainder of the stuffing in balls and lay them in, and when boiled they are ready to serve in a boat, or to turn over the meat.

### SOUSE.

Boil it until it is tender, and will slip off the bone. If designed to pickle, and keep on hand, throw it into cold water and take out the bones ; then pack it into a jar, and boil with the jelly liquor an equal quantity of vinegar, salt enough to season ; cloves, cinnamon, pepper enough to make it pleasant, and pour it on the souse scalding hot, and when wanted for use warm it in the liquor, or make a batter and dip each piece in, and fry in hot butter. This way is usually preferred, and is as nice as tripe.

### TRIPE.

This should be boiled tender, pickled and cooked like souse, or broiled like steak, buttered and peppered well. If not pickled, it should be kept in salt and water, and changed every day while it lasts.

### CHICKEN PIE.

Boil the chickens tender, or nearly so, having them cut in pieces. Make a rich crust, adding a little saleratus, and an egg or two to make it light and puff. Lay it around the sides of the pan, and then lay in the chickens ; between each layer sprinkle in flour, pepper, salt, and butter, with a thin slice of paste here and there. Then add the water in which they were boiled, and cover them. They should be baked an hour or an hour and a half, according to the size of the pie.

### TO COOK PIGEONS.

After they are well dressed, put a slice of salt pork and a little ball of stuffing into the body of each. Flour the pigeons well, and lay them close in the bottom of the pot. Just cover them with water, and throw in a piece of butter, and let them stew an hour and a quarter if young, if old longer. This is preferred to roasting, or any other way

they can be prepared. They may be cooked in the same way without stuffing.

### TO COOK FRESH FISH OR EELS.

The fish should not be laid in until the fat is hot. Beat up an egg or two, and with a pastry brush lay it on the fish, shake crumbs of bread and flour mixed over the fish, and fry them a light brown, turn them once, and take care they do not break. A more common method is, to fry them after salt pork, dipping them in Indian meal or flour. Lay the skin uppermost, to prevent its breaking. Soaking fresh fish or fresh meat in water is injurious; after they are well dressed, they should be kept dry in a cool place, and if necessary, salted.

### SOUNDS AND TONGUES.

Make a batter of eggs and flour, or beat one egg, and dip them in the egg and then in the flour, and fry in butter, or boil them twenty minutes, and use drawn butter gravy.

### TO BOIL FRESH CODFISH.

Put it in when the water is boiling hot, and boil it twenty or thirty minutes, according to the size of the fish. Use melted butter or oyster sauce for gravy.

### TO MAKE A CHOWDER.

Lay four or five slices of salt pork in the bottom of the pot, let it cook slow that it may not burn; when done brown, take it out, and lay in fish cut in lengthwise slices, then a layer of crackers, sliced onions, and very thin sliced potatoes, with some of the pork that was fried, and then a layer of fish again, and so on. Strew a little salt and pepper over each layer; over the whole pour a bowl full of flour and water well stirred up, enough to come up even with what you have in the pot. A sliced lemon adds to the flavor. A few clams improve it. Let it be so covered that the steam cannot escape. It must not be opened until cooked, to see if it is well seasoned.

### TO BOIL SALT CODFISH.

Lay it in water over night to soak. Then put it in water to cook, and when the water becomes scalding hot, let it remain in that scalding state two or three hours. There should be but little water used, and not boiled at all, that it may not grow hard. For gravy, use drawn butter or

### CODFISH TOAST.

Shred it in fine pieces, and soak it in cold water until sufficiently fresh, then drain it well, and stir into it a table-spoonful of flour, half a tea-cupful of sweet cream, and two thirds of a tea-cup of milk, and one egg if convenient. Season it well with pepper, and let it scald slow, stirring it well. Make a nice moist toast, well seasoned, and lay it on the platter, with the fish over it, and it is ready for the table, and is a fine dish. Made as above, without toast, is also good; with vegetables, butter may be used instead of cream.

### BUTTERED CODFISH.

Shred it fine and soak as above; when the water is well drained, have a piece of butter as large as an egg, melted and hot. Stir into the fish a spoonful of flour to absorb all the water, and then lay it into the hot butter, stirring it well about five minutes, then lay it upon the platter, pepper, and send it up. This, some prefer to any other mode of preparation.

### STEWED OYSTERS.

They should be only boiled a few minutes. Add to them a little water, salt, and a sufficient quantity of butter, and pepper, roll crackers fine and stir in. Some prefer toast of nice bread laid in the bottom of the dish, with less cracker Either are nice. They should be served hot.

## EGGS.

### PRESERVING EGGS.

Put a layer of salt in the bottom of a jar, and stick the eggs point downwards into the salt, to make a layer. Then add another layer of salt, and then of eggs, until the jar is full. This keeps them fresh and good. They may be kept well in lime water and salt. They should be well covered, and kept in a cool place. One cracked one will spoil the whole. They are cheapest in spring, and during September. If you have hens of your own, keep a jar of lime water always ready, and put in the eggs as they are brought from the nest. Jars that hold four or six quarts are best, it is well to renew the lime water occasionally. There is no sure

way of discerning the freshness of eggs. It is always best to break them separately in a saucer when used. If you get them to pack, lay them in a pan of water, and those that float, will not answer to put away.

### TO BOIL EGGS.

The fresher they are, the longer time they require. Three minutes will boil them very soft, five minutes will cook hard all but the yolk, and eight minutes will cook them hard through. Ten minutes will cook them hard enough for dressing to fish or salad. If you boil them in a tin egg-boiler placed on the table, scald it well, and then it will take five minutes to boil even soft. The most convenient way to eat a boiled egg, is from an egg-cup. Use salt, butter and pepper.

### TO FRY EGGS.

This is done after frying ham usually. If there is not enough of gravy from the meat, add some clean lard, and have it hot. Break the eggs into a bowl, and slip them carefully in the lard without breaking the yolk. Let them fry gradually, dipping the hot lard over them until they are cooked sufficiently without turning them at all. Then lay them on a plate or dish as they were cooked, and they look much more delicate than if they had been turned.

### POACHED EGGS.

The beauty of eggs cooked in this way, is to have the yolk blushing through the white; which should be just hardened to form a transparent veil for the egg. Have some boiling water in a stewpan, let it be half full, break each egg separately into a saucer, and carefully slip it into the water. When the eggs are set, put it on the coals, and as soon as the water boils, they are done.

### SCRAMBLED EGGS.

Beat seven or eight eggs quite light, throw them in a pan, with salt and butter. Stir them until well thickened, and turn them on a hot dish, without allowing any to adhere to the pan. This is excellent with a light breakfast.

### OMELET.

Five or six eggs will make a good sized omelet; break them into a basin, and beat them well with a fork. Add a salt-spoon of salt, some chopped parsley, and two ounces

of butter. Have the same amount of butter hot in the pan and stir in the omelet until it begins to set. Turn it up all round the edges, and when it is a nice brown, it is done. Turn a plate up over it and take it up by turning the pan up side down. Serve hot. It should never be done until just wanted.

### PICKLED EGGS.

Boil twelve eggs quite hard, and lay them in cold water to peel off the shell, then put them in a stone jar with a quarter of a pound of mace, the same of cloves, a sliced nutmeg, a table-spoonful of whole pepper, a little ginger root, and a peach-leaf. Fill the jar with boiling vinegar and cover it that it may cool slowly. After three days, boil the vinegar again, and return it to the eggs and spices. They will be fit for use in a fortnight.

### BREAD OMELET.

Put a handful of bread crumbs in a sauce pan, a little cream, salt, pepper, and nutmeg. When the bread has absorbed all the cream, then break into it ten eggs, beat all together and fry like an omelet.

## CHAPTER VI.

## VEGETABLES

### POTATOES.

They should be kept covered in winter to keep them from freezing, but in summer they need a dry place, and should have the sprouts rubbed off. When boiled, they should be washed and only pared where it is necessary. If they are inclined to crack, put them in cold water. When they are done, pour it off, and keep them covered by the fire until they are wanted for the table. Old potatoes will require an hour if large, new ones, half an hour. Never send them to the table with the skins on, unless they are new. Potatoes are nice baked, but they require more than an hour in cooking.

When the skins become shrivelled in spring, they should be pared, sliced, and boiled in a small quantity of water, as they will require but about fifteen minutes in boiling.

Mash them with a beetle for the purpose, season them wel. with salt, sweet cream, or milk, enough to moisten, or butter will answer the same purpose. Dish them, and if you prefer, brown them on the top. Cold ones may be cooked in various ways. They are very nice sliced thin as possible, and warmed carefully in half a tea-cupful of cream, or milk, and salt to season them well. They make a favorite dish by being sliced rather thick, and broil them on the gridiron and butter and salt them; they are nice, and look well, grated, minced with the yolk of an egg made in small cakes, and fried in butter for breakfast. "Snow balls" are mealy potatoes boiled, peeled and pressed in a cloth into the shape of a ball. Potatoes boiled and mashed while hot, are good to use in making bread, cake, puddings, &c.; they save flour, and less shortening is necessary.

### SWEET POTATOES.

Should be kept in earth or sand in cold weather, or they will be scarcely eatable after October. The best way to cook them, is to bake them. They may be boiled as other potatoes, peel them as others. They are also good stewed with fresh pork, veal or beef, or they may be half boiled, peeled, sliced and fried in butter, or nice dripping.

### WINTER SQUASH.

This is a very nice vegetable. It is good to use in August, and should be kept in a dry, and in winter, a warm place. Pare it, scrape out the seeds, cut it in pieces, boil it in a small quantity of water, or if you are boiling potatoes, lay it on the top and cover it, that it may cook well. When done, which will be in half or three quarters of an hour, press out the water as dry as possible. mash well, and season with salt and butter.

### SUMMER SQUASH.

They are good when yellow and tender, but when the skin becomes hard they are out of season. Cut off the top and lower part, wash and boil with other vegetables, or alone as long as potatoes, and if large, and not very tender, longer. Have a cloth strainer ready in a pan, and put them into it when done; if the seeds are large, take them out, but if not, let them remain, press the squash by winding up the ends of the strainer, and using a beetle to ex-

tract all the water; then lay it in the pan along, add salt and butter, mash well, and it will be a nice dish indeed. Cooked in any other way, they will be watery and insipid.

TURNIPS.

Pare or scrape the outside; if large, cut them in half, or quarters; boil as long as potatoes. When tender, take them in a pan, lay a small plate over them to press out the water; when pressed once, heap them high and press again, repeating it until the water is out. Then add salt and butter, and send them to the table hot. Dish them, and lay the pepper in regular spots, if you wish to have it look well. Turnips should be kept in the cellar, where they will not dry or freeze. When cooked with boiled salted meats, they are best sent to the table whole.

PARSNIPS.

Pare or scrape or split them in two, that the inside may cook tender, which will be in two or three hours, according to their size. Dry them in a cloth when done, and pour melted butter over them in a dish, or serve plain. They are good baked, or stewed with meat. They may be served with boiled ham, salt cod, or any boiled meat.

CARROTS.

These may be cooked as parsnips, to accompany boiled beef or mutton. Small ones will cook in an hour.

CABBAGE.

All vegetables of this species should be carefully examined and washed, cut in two, and placed in cold water awhile, with a little common salt thrown into it. It is said that this will draw out the worms or insects, and that they will sink to the bottom, so that greens or cabbages may be made free from anything of the kind. They should be boiled an hour or more, and the water pressed out before sent to the table. They should be kept in the cellar, or in a hole in the ground.

CAULIFLOWERS.

Separate the green part, and cut the stalk close, let it soak a while in cold water, tie it in a cloth, and lay it in boiling milk and water, observing to skim it well. When tender, which will be in an hour and a half or two hours, take it up and drain it well; send it to the table with melted butter in a boat. Broccali is cooked in the same manner.

### RUTA BAGA.

This turnip is large, of a redish color, and will boil in about two hours. Pare it, cut in quarters or slices, and let it be awhile in cold water. When boiled tender, cook them like other turnips; either mash them, or send them to the table with melted butter over them in slices. It is said that the sun shining upon turnips, after they are cooked, will injure their taste.

### BEETS.

Wash them clean with a cloth, rubbing them well. Be careful not to cut them, unless they are very large, and then you may cut them in two, not splitting them. They require, when grown full size, three or four hours' boiling. When tender all through, scrape off the outside, split or cut them in thin round slices, and pour over melted butter, and sprinkle with pepper. Boiled beets sliced, and put in spiced vinegar until pickled, are good. The tops of beets are good in summer boiled as greens. Beets should be kept in the cellar, covered with earth to keep them fresh. It is said that they are nicer roasted as potatoes for the table.

### ONIONS.

It is well to boil onions in milk and water, to diminish their strong taste. They require an hour or more, and when done, press out the water a little, and season them with a little salt, pepper, and a little melted butter. They should be served hot, with baked or roasted meats. They should be kept in a dry place,

### TOMATOES.

If very ripe they may be skinned easily, but it is better done by pouring over them boiling water. Cut them fine, and lay them in a stew-pan, with salt, a third of a teaspoonful of pepper, and a piece of butter; cover them, and let them cook rapidly fifteen minutes. Have bread crumbs ready rubbed fine, and add to it while boiling; let it remain until they are soft, which will be, unless too hard, in two or three minutes; they must cook gently after the bread is in. They are good cooked in this way without the bread, but in that case they should stew uncovered, and longer. Prepared in the former manner is generally preferred, as it is less juicy. If cooled without the bread, they may be

laid on a nice buttered toast, or sent to the table plain. They are kept best hung up on the vines in a dry place in the fall, as long as possible, but they should not be kept until they begin to decay. In Asia Minor they are preserved for use during the winter, in the following manner: Cut them in two, and sprinkle on them considerable fine salt to remain over night. Next day pass through a cullender. Set the part strained through to dry in the sun, in shallow dishes, in depth an inch or less. Dry it to more consistence than jelly, and put in covered jars for use. If it is not sufficiently dry to keep, add more salt and expose it again to the sun. A table-spoonful will season a soup or stewed meats.

### ASPARAGUS.

Cut when two or three inches long, wash and place the heads all one way, and tie in bundles with thread or twine. Have your water boiling, with a little salt, and lay it in, keeping it boiling half or three quarters of an hour, according to its age. Toast two slices of bread, moisten it with the water in which the asparagus is boiling, season with salt, and lay on a small platter or dish. Then drain the asparagus a moment, and, laying the heads inward, spread it on the toast, pouring over it melted butter and pepper.

### GREEN PEAS.

They are best when first gathered and shelled. They lose their flavor and sweetness by being kept; but if kept, do not shell them until they are needed. Put them in while the water boils, and only have just enough to cook them done. Season with salt, pepper, and a good supply of butter. If they have been kept, or if they are not a sweet kind, they are greatly improved by the addition of a spoonful of sugar, and, if a little old and yellow, a piece of saleratus. Another method is said to be an improvement. Place in your sauce-pan or boiler several leaves of head lettuce, put in your peas, with an ounce of butter to two quarts of peas; cover the pan or boiler close, and place it over the fire; in thirty minutes they are ready for the table. Season with pepper and salt, &c. It is said they are better than when cooked in water. Green peas should be boiled from twenty to sixty minutes, according to their age.

STRING BEANS.

Select those only that are tender, cut off the ends, and wash them well, take a handful and lay them even, and cut them very fine with a sharp knife upon a board or table. Put them in when the water boils, and if very tender they will require but half an hour; if not, longer. Season as peas.

Sweet Corn. This is sweeter for being boiled on the cob. If made into succotash, cut it from the cobs, and boil it with new shelled beans. It will require half an hour or more. Season with sweet cream or butter, salt, pepper, a little nutmeg, and a table-spoonful of loaf-sugar. It makes a most delightful dish to accompany a nice bit of boiled pork.

Spinach. Pick it clean, and wash in several waters. Drain and put it in boiling water, and be careful to remove the scum. When tender, drain and press it well. Chop it fine, and put in a sauce-pan with a piece of butter and a little pepper and salt. Set it on hot coals, and let it stew five minutes, stirring it all the time. It requires about ten minutes to boil.

Egg Plant. The purple egg plant is better than the white ones. Boil them whole in plenty of water until tender, then take them up, drain them after having taken off the skins, cut them up and wash them in a deep dish or pan; mix with them some grated bread, powdered sweet marjoram, and a large piece of butter, and a few pounded cloves. Grate a layer of bread over the top, and brown it in an oven. Send it to table in the same dish. It is generally eaten at breakfast. If you fry them, slice them, without being pared, about half an inch thick, and let them be an hour or two in salt water, to remove their strong taste. Take them out, wipe them, and season with pepper and salt. Beat some yolk of egg, and grate some bread crumbs. Have ready, in a frying-pan, some lard and butter hot. Then dip the plant first in the eggs, then in the crumbs, till both sides are covered, and fry brown, taking care to have them done through, as otherwise they are very unpalatable.

VEGETABLE OYSTER, OR SALSIFY. This excellent plant grows like a parsnip, and is, in flavor, very much like fresh oysters. Scrape them, and cut them round in thin slips, boil them tender in milk and water, season them well with pepper, butter, and salt; make a nice toast, moistened with the gravy laid in the bottom of the dish, and pour the whole over it. You could scarcely detect the difference. There should be but a suitable quantity of the gravy, too much lessens the flavor. It is sometimes cut up and parboiled, chopped fine, and fried in batter. The roots may be first cooked tender, then fried whole in batter.

LIMA BEANS. Wash them and boil two hours, or until they are soft; season with salt, pepper, and butter, not having much gravy. Use only water sufficient to boil them. They may be kept through the winter by gathering them on a dry day, before they are the least hard, and packing them in their pods in a keg. Throw salt in the bottom, then a layer of pods, then salt, then pods, until it is full. Press down with a heavy weight, cover the keg closely, and keep in a cool dry place. When used, soak them in the pods over night in cold water, the next day shell them, and soak until ready to boil.

DRY BEANS. Look them over, wash and soak over night. Cut a new piece of salt fat pork, not too large, as it will make the beans too salt and hard, cut the rind in thin strips, and change the water on the beans, and boil them together until the beans become soft. Take them out into a bean dish, or deep dish of some kind, lay the pork in the centre, having the rind just above the beans, pepper them, and have gravy enough to almost cover. It should be about even with the beans, then set in an oven and bake an hour, or until the pork is crisped. Some add a little molasses, and they are more healthy cooked with a little saleratus. Soft water should be used, if possible, to boil in, or saleratus is necessary.

DRY GREEN CORN. It must be gathered when just good to boil, strip off the husks and throw them in boiling water, and let them remain until the water boils over them, then take them out, and shell off the corn by run-

ning the prong of a long fork along the base of the grain. This method saves the kernel whole, and is much more expeditious. Spread it thin on cloths in an airy, shaded place to dry, and stir it every day until thoroughly dry. When cooked, put it in cold water, and boil three hours. Let the water boil nearly off, add a little milk and sweet cream, or butter, pepper and salt, and it is very nice. If you wish succotash, soak dry white beans over night, and boil with them. It is a nice rare dish in winter and spring.

Artichokes are very good cut in thin slices, with vinegar, salt, and pepper. If cooked, they must be boiled two or three hours closely covered, and, when tender, served with melted butter.

Fried Cucumbers. When pared, cut them in slices as thick as a dollar. Dry them with a cloth, and season with pepper and salt, and sprinkle them well with flour. Have butter hot, and lay them in. Fry of a light brown, and send to the table hot. They make a breakfast dish. When used raw, slice them into cold water to extract the unhealthy properties. Then season well with salt and pepper, with vinegar.

Sea Kale. This is prepared boiled, and served up as asparagus.

Mushrooms. Those of the right kind appear in August and September, after a heavy dew or misty night. They may be known by their pale pink or salmon color on the under side on the gills, while the top is a dull peach colored white. They grow only in open places where the air is clear. After they have been gathered a few hours the pink color turns to brown. There should be the utmost care in selecting only those that are good, as the others are a deadly poison. They are of various colors, sometimes all white, or scarlet, or yellow. It is easy to detect them when fresh, but not after they have lain awhile.

Dandelions, when gathered young, are good for greens. They require half an hour. Milkweed tops are very nice when cut young; these are both improved by cultivation. They require nearly an hour. Poke-root

is good when it is first starting from the ground, and is frequently brought to market. If at all too old it should not be eaten, as it is unwholesome. Boil it like asparagus one hour, in plenty of water. Serve with, or without toast, but with melted butter in a boat. Young horse-radish leaves, dock leaves, plantain, patience, &c., make nice greens in the spring. They require about half an hour. Drain and press them, to accompany boiled meats.

## SALADS

Radishes. Wash them, and let them lie in clean cold water as soon as they are brought in. Before they go to table scrape off the outside skin, trim the sharp end, leave the stalk about an inch long; if large, split them in four, half way down, and send them to the table in tumblers, to be eaten with salt.

Celery. Scrape and wash it well, let it lie in cold water until just before used, dry it with a cloth, trim it, and split down the stalks almost to the bottom. Send it to table in a celery glass, and eat with salt only; or chop it fine and make a salad dressing for it.

Lettuce. Strip off the outside leaves, split it and lay in cold water awhile. Drain and lay in a salad dish. Have ready two hard boiled eggs, cut in two and lay on the leaves. If you choose, it may be dressed with sugar and vinegar, with a little salt, before it goes to the table. Some prefer a dressing of salt, mustard, loaf sugar, and vinegar, sweet oil, and a mashed hard-boiled egg. With the salad cut fine, and this over it.

Coldslaw. Select the hardest, firmest head of cabbage. Cut it in two, and shave it as fine as possible. A cabbage cutter is the best. It must be done evenly and nicely. Lay it in a nice deep dish. Melt together vinegar, a small piece of butter, pepper, a little salt. Let it scald and pour over it.

Hotslaw. This is made in the same manner, except it is laid in a sauce pan with the dressing, and just scalded, but not boiled. Send it to table hot.

## PICKLES.

Kettles of block tin, or lined with porcelain, are best for pickling. Iron discolors the vinegar, and brass or copper, unless used with great care, is poisonous from the verdigris produced by acids. Pickles should always be covered with vinegar. If they show symptoms of not keeping well, scald the vinegar with fresh spices. Vinegar for pickles should never boil over five minutes, as it destroys the strength.

Cucumbers. Let your cucumbers be small, fresh gathered, and sound. Make a brine strong enough to bear up an egg, boil and skim it, and pour upon the cucumbers, and let it stand twenty-four hours. Take good vinegar, cloves, cinnamon, and pepper, and boil together. Have your cucumbers in a large stone jar, and pour the hot spiced vinegar over them. If you wish them green, add a little alum with the spices, to boil in the vinegar. Cover them well.

Melons. To make mangoes of melons you must gather them green, and pour over them a boiling hot brine strong enough to bear an egg, and let them stand five or six days. Then slit them down on one side, take out all the seeds, scrape them clean, then take cloves, ginger, nutmeg, or cinnamon and pepper, with small cucumbers and mustard seed, to fill them; sew them up with coarse thread, or tie them and lay them in a jar, and pour over them hot spiced vinegar. Cover them, and they will keep sound almost any length of time.

Tomatoes. They should not be very ripe. Mix in a stone jar an ounce of mustard, half an ounce of cloves, half an ounce of pepper, with half a jar of vinegar. Lay in the tomatoes with a dozen of onions and cover it close for a month. They will then be fit for use. If the jar is kept well covered, they will keep a year. The onions may be omitted if you choose, and more spice substituted.

Pepper. The bell pepper is considered best by some for pickling, and should be gathered when half grown. Slit one side and carefully take out the seed and core, so as not to injure the shell. Pour over them a strong hot brine, and

keep them warm; some simmer them a whole day. You may take them out next morning, when cool, and stuff them like mangoes, or lay them in a jar with mustard sprinkled over them, and fill up the jar with vinegar. They require no spice, and should be pickled alone. The vinegar may be put on cold, with a piece of alum to give them a fine green, and it tends to harden and preserve pickles of any kind.

Butternuts. Gather them when they are easily penetrated by a pin, as early as July, when the sun is hot upon them; lay them in a tub, with sufficient lye to cover them, and stir them round with a stiff broom to get off the roughness, or they may be scalded and rubbed with a cloth. Soak them in salt and water a week, then rinse and drain them. Pierce them through with a long needle, and lay them in a stone jar. Boil cloves, cinnamon, pepper, and ginger in the vinegar, and pour over them. Sprinkle through them two spoonsful of mustard seed previously, if you have it. They should be closely covered from the air. Walnuts may be pickled in the same way.

Peaches. Take any kind of fine large peaches that are not too ripe, wipe off the down with a clean flannel, and lay them whole in a stone jar. Dissolve a table-spoonful of salt to each quart of vinegar cold, and cover them. Secure them well from the air. Plums and grapes, and barberries, may be pickled in the same manner, except the salt, with the stems on. Add spices if you choose. They look beautiful, and barberries are sometimes used to garnish the edge of dishes.

Cherries. Use the common, or Morella cherries, pick off the stems, see that they are perfect, and lay them in a glass or earthen jar, with sufficient cold vinegar to cover them, and keep them in a cool place. They need no spices, as they retain their own flavor.

Cauliflower. Select the whitest and closest, full grown; cut off the stalk, and divide the flower into eight or ten pieces, scald them in strong salt and water; let them remain in the brine till next day. Then rinse and dry them. Lay them carefully in a jar not to break or crush

them, and pour over them hot spiced vinegar. When the vinegar is cold, a few barberries or green grapes, put in the same jar, do not injure them, and add much to their beauty on the table. Broccali and asparagus the same.

CABBAGE. Take red or white cabbage, quarter it lengthwise and crosswise. Select the firmest for pickling, and after it has lain in salt and water four days, drain it and pour over it hot vinegar, in which has been boiled cloves, mace, alspice, and pepper; if you wish to preserve the color of the red cabbage, put a little cochineal to brighten it, with a little alum. It will be more tender to repeat the scalding vinegar several times. Cover it closely.

ONIONS. Peel and soak them in salt and water three days. Then just scald them in milk and water, drain and dry them. Scald the spices with the vinegar, adding a piece of alum, and when cold pour over them. If kept in bottles, put a few spoonsful of sweet oil on the top. Cover close.

MARTINOES. The salt and water, in which they should be soaked two or three days, must be changed every day or they will become soft. Use alspice, cloves, and cinnamon, and scald the martinoes with the spices in the vinegar. Secure them from air.

NASTURTIONS. They should be gathered when full grown, but not old, and when the stems are taken off, wash them, and pickle in plain cold vinegar. Capers are done in the same manner. Both of these are best with boiled mutton.

RADISH PODS. Gather them in sprigs or bunches, young and tender, and after letting them stand in salt and water three days, then pickle like cucumbers.

GREEN BEANS. Gather them half grown, and pickle in cold vinegar, with spices.

SOUR KROUT. Cut cabbage fine, as if for slaw, then pack down in a cask, first a sprinkling of salt, then a layer of the cabbage, then salt, then cabbage, until it is full, or nearly so. Then press it down closely, pounding it with something heavy to pack it close. Lay over it

a round cover with a heavy to stone, to ripen. It is not used until it has undergone a fermentation. When prepared for the table, it is fried in butter, or nice dripping, and is with many a favorite dish.

HIGDOM, is made of green melons, cucumbers, and onions. Take off the rinds, and slice and chop them fine; green peppers are also used. Then add mustard-seed and spices. Press it into a jar, and cover with vinegar. In a week or two it will be ready for use. If onions are not agreeable leave them out. It is a nice pickle.

PARSLEY may be tied in small bunches, and pickled like cucumbers.

CHOPPED CABBAGE. When the heads are not close, chop them fine, and season with red pepper, salt, and vinegar, and it makes a very convenient and wholesome salad for the table.

EAST INDIA PICKLE. This is a combination of various pickles in the same jar. Take radish pods, green peppers, long and round, green grapes, capers, nasturtions, walnuts, butternuts, peaches, apricots, cherries, and button onions; pour over them a hot brine that will bear an egg, and let them stand four days, stirring them every day. Then make a pickle very warm with spices, and after it has been boiled, and the ingredients well dried from the brine, pour it over them boiling hot; mustard-seed may be added, and then it must be covered close from the air. This will keep, if well prepared, two years.

Stone and wood are the only suitable materials in which to keep pickles. All pickles should be stirred up occasionally. When any scum rises, the vinegar needs scalding. When the vinegar becomes weak it should be thrown away, and new substituted in its place. Good, but not the sharpest vinegar, is best for pickling. If brass or copper is used in preparing pickles, it should be thoroughly cleansed before using, with vinegar and salt, and no vinegar allowed to cool in them, as it would then be poisonous.

Cucumbers may be preserved in salt or brine, for any length of time. But there should be a weight upon them

to keep them well covered, or they will become soft. When prepared for pickling they must be soaked and scalded. No salt will be needed in the vinegar.

### TO PICKLE OYSTERS.

Take those that are large, separate them from their liquor, and pour over them boiling water; take them out and rinse them. Put them in a kettle with just water enough to cover them, a table-spoonful of salt to every hundred oysters, and just let them boil up. Take them out on a large board, and cover them with a cloth. Take the liquor of the oysters, and with every pint mix a quart of the best vinegar, a table-spoonful of whole cloves, the same of whole black pepper, a tea-spoonful of whole mace. Heat the liquor, and when it boils put in the oysters, and stir them five minutes. Then let them cool. When cold, put them in jars, and cover them securely.

## CATCHUPS.

### TOMATOE CATCHUP.

Take six pounds of tomatoes, and sprinkle with salt; let them remain a day or two, then boil, and press through a coarse sieve or cullender. Put into the liquor half a pint of vinegar, cloves, pepper, ginger, and cinnamon, boil them one third away; bottle tight. It should be shook before being used.

### MUSHROOM CATCHUP.

Take the full grown tops of mushrooms, wash clean, crush them, and throw a handful of salt with every peck, and let them stand all night. Put them in a stew-pan, and let them stand in a quick oven twelve hours. Strain them through a hair sieve to press out all the juice. To every gallon of liquor put, of cloves, Jamaica or black pepper, and of ginger, an ounce each, and half a pound of salt. Set it on a slow fire to boil until half gone, then, when cooled in an earthen vessel, bottle for use. It sometimes needs boiling the second time to keep long.

### WALNUT CATCHUP.

Take a peck of green walnut shells, put them in a tub, bruise and mash them, and throw on two or three pounds

of salt, and water enough to cover them. Let them stand six days, straining and mixing them until they become soft and pulpy. Drain out the juice by letting the tub stand on one side a little, with the shells in the elevated part. As often as it needs, turn out the liquor and continue it as long as there is any, which will be five or six quarts. Then boil it in iron as long as scum arises; then add a quarter of a pound of ginger and alspice; two ounces of pepper and cloves, and let it boil slowly half an hour. The spices should be powdered, and a quantity of it should go into each bottle. Cork them tight, put them in a cool dry place one year before it is used.

### PUDDING CATCHUP.

Mix together half a pint of noyau, a pint of wine, the yellow peel of four lemons pared thin, and half an ounce of mace. Put the whole in a large bottle, and let it stand two or three weeks. Then strain, and add a strong syrup of sugar. Bottle it, and it will keep two or three years. It may be used for pudding sauce, mixed with melted butter, and various other sweet dishes.

## HOW TO MAKE VINEGAR.

### WHISKEY VINEGAR.

Take five gallons of soft clean water, two quarts of whiskey, two quarts of molasses, and half a pint of good fresh yeast. Lay a sheet of white paper at the bottom of the keg, and put in the mixture. Place it in the warm sun, and in six weeks it will be fit for use. If made in winter, it should be kept where there is a fire.

### CIDER VINEGAR.

This may be made of poor cider, or that which is good, weakened a little with water. It should be partly drawn off, after the cider is well worked, leaving the casks about two-thirds full. A piece of wire gauze, or a linen cloth, let in a little, should be nailed over for a cover to keep out flies, and also for a strainer. When the vinegar is good, which will be sometimes in six months by frequent shaking, it may be increased by adding occa-

sionally the juice of fruit, the rinsings of sweetmeat jars, cold tea, &c.

### SUGAR VINEGAR.

To each gallon of water, add two pounds of brown sugar and a little yeast; expose it to the sun six months in a vessel slightly stopped.

### HONEY VINEGAR.

Mix one pound of honey with a gallon of cider, and expose it to the sun, or keep it where it is warm, and in a few months it will be so strong that water will be necessary to dilute it.

### PERRY VINEGAR.

Put thirty or forty pounds of wild pears in a tub, pour water over them, and leave them three days to ferment. Repeat this every day for a month, at the end of which it will be good vinegar.

## HOW TO MAKE BEER.

### WHITE SPRUCE BEER.

Three pounds of loaf sugar, five gallons of water, with enough of essence of spruce to give it a flavor, a cup of good yeast, a little lemon-peel if you choose, and, when fermented, bottle it up close. It is a delightful beverage in warm weather.

### GINGER BEER.

One cup of ginger, one pint of molasses, one pail and a half of water, and a cup of lively yeast. In warm weather it may be made cold, but, in cold weather, scald the ginger with two quarts of hot water, and the rest cold. The yeast put in when slightly warm. It should be put in jars or bottles, and securely corked. It is pleasant and lively, and will keep several weeks.

### COMMON SMALL BEER.

A handful of hops to a pailful of water, a pint of bran, and half a pint of molasses, a cup of yeast, and a spoonful of ginger.

### ROOT BEER.

Take a pint of bran, a handful of hops, some twigs of spruce, hemlock, or cedar, a little sassafras, or not, as

you have it; roots of various kinds, plantains, burdocks, dock, dandelions, &c.; boil and strain, add a spoonful of ginger molasses to make it pleasant, and a cup of yeast When you want it soon, let one bottle stand where it is warm, and the rest will workcold. This for a gallon.

### MOLASSES BEER.

Six quarts of water; two quarts of molasses; half a pint of yeast; two spoonsful of cream tartar. Stir all together. Add the grated peel of a lemon; and the juice may be substituted for the cream tartar. Bottle after standing ten or twelve hours, with a raisin in each.

### HARVEST DRINK.

Mix with five gallons of good water, half a gallon of molasses, one quart of vinegar, and two ounces of powdered ginger. This will make not only a very pleasant beverage, but one highly invigorating and healthful.

### TO RESTORE ACID BEER.

Stir in a small quantity of saleratus with a spoonful of sugar, and it is even richer and better than at first To be prepared as you use it.

### LEMONADE.

Take good lemons, roll them; then cut and squeeze them into a pitcher. Add loaf sugar and cold water, till it makes a pleasant drink. It should be sweet; it is sometimes too acid to be agreeable. Send round in small glasses with handles, or tumblers a little more than half full. The best drink for parties.

### ORANGEADE.

This is made in the same manner as lemonade.

### TO PRESERVE LEMONPEEL.

A pint of lemon juice to a pound of powdered loaf sugar. When all melted, bottle close, and keep in a dry place.

### ESSENCE OF LEMON PEEL.

Grate off the rinds of lemons with loaf sugar in lumps, until the yellow part is all off. Take it up as fast as you proceed, and put it in a cup or china jar, and cover it closely. Oranges may be prepared in the same way. It may be used for cakes, pies, puddings, &c.

## HOW TO MAKE COFFEE.

### PARISIAN COFFEE.

This is made by leeching. Many prefer it tc any other mode. It is very easily made, and requires nothing to settle it. Any common coffee-pot will answer the purpose, with a strainer formed to fit the top. It is made in form, like a cup with fine a strainer made by piercing the bottom full of small holes very fine, and above that another not as fine, on which the ground coffee is laid. Pour on boiling water, using the same quantity as in other modes, and cover it close, when the water is all drained through, which will be in ten minutes or less, it is ready for the table. Some have biggins made in the French mode, but the other answers the same purpose, and is equally good. It should stand near the fire while cooking. It will leave the dregs tasteless.

### THE COMMON METHOD.

A general rule. Allow one table-spoonful to a person, of ground coffee. Have your coffee-pot free of old dregs, and well rinsed. Old grounds spoil the taste. Wet your ground coffee with cold water, and add a piece of fish skin as big as a shilling; or a piece of a porkrind, or stir in a part of an egg, not more than a spoonful, as more prevents the strength of the coffee from extracting. It forms a mass when a whole egg is used, and cooks around the coffee, so that about half the strength is lost. Pour on boiling water and let it boil ten or fifteen minutes, pour out a cup full and pour it back to clear the spout, if you do not use an urn. Take it from the coals, and let it settle a few moments, before sending it to the table. Have rich sweet cream or boiled milk, with the yolk of an egg stirred into it, (or it will do without,) and good sugar, and this mode of preparation will be equally good as French coffee.

Great care is necessary in roasting it; unevenly, or over-roasted, will spoil it; and if it is not sufficiently brown, it will be insipid and wanting in flavor. There is also a great difference in the kinds of coffee. Some is better flavored than others. The green and small is generally best.

To have coffee very good, it should be browned just before it is made, though this is an inconvenience. Pick out the stones, and bad grains, and lay in a dripping pan, or tin, a layer to dry. Set it in an oven after baking, or under a stove a few hours, and then put it in a spider on hot coals, and stir it constantly until the color of rosewood, or black walnut; stir in a small piece of butter, and put up, and cover it immediately, as it evaporates fast while hot. Never grind until just before using.

### CHOCOLATE.

To a quart of water, allow three spoonsful of scraped chocolate. Let it boil fifteen or twenty minutes, and stir while boiling. Pour in rich cream or milk, and let it boil up. Some like nutmeg grated over a cup, and I think it improves the flavor.

### TEA.

If green tea is good, it will look green when poured into the cups. Black tea should have a fragrant flowery smell. Allow one teaspoonful to a person, and one beside. Have the water boiling, scald the tea-pot, and put in the tea as soon as possible; cover it, and let it draw about five minutes; old Hyson requires longer. Black tea should boil ten minutes. Have sweet cream and loaf sugar, or the best common, crushed. There should be but a small quantity of water used to draw the tea, and it should be filled up afterwards. Black tea is healthier than green. Mixed with the other kinds half and half, is a good practice.

### COCOA.

This is similar to chocolate; but is more delicate. It is much used by those who cannot drink coffee and tea.

The directions for making come with the article on the wrapper.

## MISCELLANEOUS RECIPES.

### MOLASSES, ETC.

Take new sweet cider just from the press, made from sweet apples, and boil it down as thick as West India molasses. Four or five barrels will make one of good molasses. It should be boiled in brass, and not burned, as that would injure the flavor. It will keep in the cellar, and is said to be as good and for many purposes better than West India molasses.

### BUTTER.

Keep your pails, churn, and pans sweet. In winter warm the pans and churns with hot water, in summer cool them with cold. Keep your milk in summer where it is cool and airy, in winter where it is warm. In warm weather skim your milk as soon as it is thick, in colder weather skim as soon as there is a good thick cream, and be careful not to let it remain too long, as it will acquire a bad taste. Churn as often as you have cream enough, never less than once a week. If the cream is of the right temperature when commenced, it will not froth, and if it does, put in a little salt. Use no salt but the best ground salt, work out all the butter milk with a ladle in summer, in winter use clean hands. If you wish to keep it some time, put it down in a jar or firkin, or pickle in layers, as clean and free from buttermilk as it is possible, leaving a space for pickle over it, in the following proportions. Half a pail of water, one quart of fine salt, two ounces of loaf sugar, one ounce of saltpetre, well boiled and skimmed. When cold, cover with this, and it will keep good and sweet the year round.

### TO KEEP TOMATOES A YEAR.

Take half a bushel, skin and boil them well, then add a tea-cupful of salt, a table-spoonful of black pepper, one table-spoonful of cayenne, an ounce of cloves, an ounce of mace. Mix well, and put them in jars, and run mutton suit over them, and tie them up with strong paper or buckskin, and they will keep well, free from mould and acidity.

### MAKING CHEESE.

Take new milk, heat it ninety degrees, or more than blood warm. Have your rennet previously made, in proportions of a quart of water to a piece of rennet as big as your hand. Put in enough to turn it. If the milk is too hot, it will be tough, and if too much rennet, it will be strong.

The milk after it is warmed, should be placed in a tub kept for the purpose. When the curd has set, take a long knife and cut through the curd both ways carefully, and not break it until the whey is seen to separate. Then let it remain until the whey covers the curd well Then place a ladder over another tub with a strainer and basket, and dip the curd and whey carefully into the strainer, let it lie and drain until it has nearly ceased, and then move it by raising the sides of the strainer. It should not be urged, as that will press out the cream, and alter the taste of the cheese. If prepared the same day, the curd must be salted enough to taste right, and then put in a hoop, strainer and all, made smooth as possible, with a cover that will just fit inside, and placed in a press. When turned, which should be done in two hours, put it in a cheese cloth wet with salt and water, and in eight or nine hours turn again, and pare the edges. Let it remain twelve or fourteen hours, then take it out and oil with salt butter, and place it where it will have air, but not exposed to flies.

### NEW METHOD.

It is said, that those who have but a small quantity of milk, after making it as above described, may, after pressing out the whey as well as possible with the hands, press it compactly in an earthen or stone jar, and cover it over with several folds of dry linen, or cotton cloth. When this is saturated, remove it and place a dry one in its stead. It will be as clear of whey as if pressed, and the next day add another curd, pursuing the same process until full. This makes cheese solid, and free from moisture as the press. The labor is much less, and the care of it comparatively nothing.

### CHEESE MADE FROM POTATOES.

Cheese, it is said, of an extremely fine quality, is manufactured from potatoes in Thuringia and part of Saxony, in the following manner: After having collected a quantity of potatoes of a good quality, giving the preference to the large white kind, they are boiled in a cauldron, and, becoming cold, they are peeled and reduced to pulp, either by means of a grater or a mortar. To five pounds of this pulp, which ought to be as equal as possible, is added one pound of sour milk, and the necessary quantity of salt. The whole is kneaded together, and the mixture covered up, and allowed to remain for three or four days, according to the season. At the end of this time, it is kneaded again, and the cheese placed in little baskets, where the superfluous moisture is allowed to escape. They are then allowed to dry in the shade, and placed in layers in large pots or vessels, where they must remain for fifteen days. The older these cheeses are the more their quality improves. Two kinds of them are made. The first, which is the most common, is made according to the proportions above indicated; the second, with four parts of potatoes and four parts of ewe or cow milk. These cheeses have this advantage over every other kind, that they do not engender worms, and keep fresh for a great number of years, provided they are placed in a dry situation, and in well closed vessels.

### DUTCH CHEESE.

Take your milk in summer, after it is skimmed and thick, put it in a kettle and hang it over the fire until scalded and the curd has settled to the bottom, but not to boil. Strain it out and separate it from the whey, then turn it in a pan and add salt, sweet cream or butter, and do up in small balls for tea. They are best when fresh made.

### MACARONI.

Put a piece of butter, half a pound of macaroni, a little salt, into hot water, and let it boil three quarters of an hour. Drain it and put it in another saucepan, with butter and grated cheese, toss up the whole together, adding two or

three spoonsful of cream, and when done, put it on a dish and send to table hot.

### MACARONI DRESSED FOR A PUDDING.

Boil two ounces in a pint of milk, with a bit of lemon peel and a good bit of cinnamon, till the pipes are swelled to their utmost size without breaking. Lay them into a custard dish and pour a custard over it. Serve cold.

### HASTY PUDDING.

Have your water boiling hot, put in a spoonful of salt, then stir in sifted meal until the stick will stand in it. Stir in the meal and let it boil awhile, then finish it, and let it boil slowly fifteen minutes. It is good with butter and molasses hot, or with milk. When cold it is nice for breakfast, cut off in slices and browned in a frying pan, with a little butter or fresh sweet lard or dripping.

### HOMINY.

Wash it until the chaff is well out, which will rise on the surface of the water. Put it in cold water, and boil it four or five hours over a slow fire, add a spoonful of salt. It is very good with milk, sugar or molasses. It is much esteemed by children, and good for delicate persons.

### SOUTHERN MODE OF BOILING RICE.

Have the water boiling. Allow at least a quart of water to a pint of rice; throw in a tea-spoonful of salt; wash and pick clean and put in; let it boil twenty minutes, and if not then dry, turn off the water, and let it stand on the coals a few moments, with the lid off. The kernels will be white, and preferred by many. Use in the place of pudding, with a sweet sauce, or with meats as a vegetable.

### GREEN CORN PUDDING.

Grate or cut the corn from the cob fine. To the corn of two dozen ears, add half a pint of milk, quarter of a pound of sugar; when mixed, bake an hour and a half, or until the crust is brown. Eat simply with butter, some add pepper.

## CHAPTER VII.

## HOW TO MAKE BREAD, BREAKFAST AND TEA CAKES, ETC.

### YEAST.

Boil a single handful of hops and a sliced potatoe, in three pints of water. In fifteen or twenty minutes strain it out boiling hot on two pints of flour, stirring it well. When it is so cool that it will not scald, put in a tea-cupful of light yeast, and a little ginger; when the whole is raised, put in sifted meal, as much as can be kneaded, then take it upon your board and work it into rolls, and cut it in thin slices; lay them on tins to dry. Be careful not to scald them while drying. When done, put it in a bag, and you will have the best of yeast. Soak it at night and stir in a little flour. In the morning it will be ready for use. This is preferable to any other, at any season of the year. It cannot be affected by heat or cold. If kept in a liquid state, the same yeast may be put in a close jar or jug, and will make excellent bread.

### MILK YEAST.

Take half a pint of boiling water, and half a pint of sweet milk, stir in flour to make a batter nearly as thick as fritters. Set in a kettle of warm water, keeping it at the same temperature, and in about four or five hours it will rise and be fit for use. It must be used immediately. Make your bread with warm milk or water, and put it in your pans, and it will rise in an hour. Made in the same way without milk, with the addition of a tea-spoonful of salt, and a tea-spoonful of sugar, will make bread equally good. They are both nice in warm weather. They make bread or biscuit very white, and some prefer it to any other.

### TO MAKE BROWN BREAD.

Two quarts of luke-warm water, a half tea-cupful of molasses, a cup of yeast; wet it up stiff; when light, add a tea-spoonful of saleratus. This is for two loaves.

### INDIAN GRIDDLES.

One quart of milk, one pint of Indian meal, four eggs, four spoons of flour, and a little salt; beat it well together

and bake on a griddle or pan. Another—Take equal parts of flour and Indian meal, and a little salt; wet it in a thick batter with some milk or buttermilk, a teaspoonful of saleratus—bake as above.

### BANNOCK.

Two cups of meal, two of flour, a teaspoonful of salt, one of ginger, four spoonsful of molasses; wet with buttermilk, or sour milk, a tea-spoonful of saleratus. Bake an hour.

### "SPLENDID JOHNNY CAKE."

Take one quart of milk, three eggs, one tea-spoonful of saleratus, one tea-cupful of flour, Indian meal enough to make a batter as thick as pancakes. Bake quick in pans, well buttered. Eat warm, with butter or milk. Those who may not have eggs will find they are very good without. The milk should be sour, or buttermilk.

### POTATOE YEAST.

To a pound of mashed potatoes add two ounces of brown sugar, and two spoonsful of common yeast. The potatoes must be pulped through a cullender, and mixed with warm water to a proper consistence. This will make a quart of good yeast. It must be kept moderately warm while fermenting. If yeast is kept in a liquid state, it should be corked close in a jug, when suitably light, or in a close jar. A little salt and ginger added to the yeast, when you put it away, will improve it.

### TO KEEP HOPS.

Hops lose their fine flavor by exposure to the air and damp. They should be kept in a dry close place, and lightly packed.

### TO MAKE GOOD BREAD WITH GROWN FLOUR.

Take eight quarts of flour, six ounces of butter, one pint of yeast of the best kind, three tea-spoonsful of saleratus dissolved in half a pint of warm milk; add this to the yeast, and, after working the butter into the flour, add the yeast, and milk just enough to make the bread stiff. Knead the whole together. Bread made of grown flour must always be made harder or stiffer than any other kind. In this way good bread may be made. It should rise and bake like other bread.

### PLAIN FRITTERS.

Take a quart of buttermilk, or sour milk, a pint or more of sweet milk, three beaten eggs, a tea-spoonful of salt, and a tea-spoonful of saleratus; stir in flour enough to make a thick batter. Have your lard hot, and drop them neatly by the spoonful into the lard, and fry them a light brown. Serve them with liquid pudding-sauce, or sprinkle over them sugar and nutmeg, or serve plain.

### TEA BISCUIT.

Take two cups of cream, one of sour milk, a tea-spoonful of salt, and one heaping tea-spoonful of saleratus dissolved, stirred in last. Mix as soft as possible to roll, cut with a tumbler, and bake in a quick oven half an hour. This will fill one tin. If you have no cream, use half sour milk, and half melted butter, or clean dripping instead, which will be equivalent to cream, though not quite so nice.

### EXCELLENT APPLE FRITTERS.

Pare your apples, and cut in thin slices, and mix them with your flour. Stir in a quart of milk and four eggs, a little salt and saleratus, to make a thick batter. Fry in plenty of lard.

### CREAM FRITTERS.

Take a quart of sweet milk and a tea-cup full of cream, four eggs beat to a froth, half a nutmeg, or grated lemon peel, and a tea-spoonful of salt. Stir them with flour sufficient to make a thick batter, dissolve a small tea-spoonful of saleratus and stir in, then fry as above.

### BUCKWHEAT CAKES.

Mix a quart of flour with a pint of lukewarm milk (some prefer water), add tea-cup of yeast, and set in a warm place to rise. In the morning, if sour, add a tea-spoonful of saleratus, and a little salt. Bake as griddles, and butter when hot. These are nice for breakfast, or with butter and sugar for tea. When you make them every day, leave a little in the jar, and it will raise the next.

### SODA BISCUIT.

To one quart of flour add two tea-spoonsful of cream of Tartar, dissolve a tea-spoonful of soda in sufficient water to

wet the flour. They may be made in a few moments, and are very nice with coffee, for breakfast.

### OYSTER-CORN CAKES.

Take one quart of green corn, rasped from the ear with a coarse grater, two tea-cupsful of milk, one tea-cupful of flour, and two eggs well beaten. Season the batter with salt and pepper, and bake on a griddle. This makes a capital dish.

### MOCK OYSTERS.

This is similar. Grate twelve ears of corn, wash the cobs in a tea-cupful of milk; add to this three eggs, two spoonsful of flour, one tea-spoonful of salt, and bake as above. They have the flavor of oysters, and are very nice.

### HOT ROLLS.

Dry your flour before the fire, add a little warm milk, with two spoonsful of yeast, an egg well beaten, and a little salt. Let it stand all night, and bake the rolls in a quick oven.

### HOE CAKE.

Scald a quart of Indian meal, with just water enough to make a thick batter. Stir in two tea-spoonsful of butter. Bake in a buttered pan half an hour.

### RICE CAKES.

Boil a cup of rice to a jelly, add a little milk, two spoonsful of butter, a little salt, four eggs well beaten, and flour to make a batter. Fry as other griddles, and serve hot, with powdered sugar and nutmeg. Another way is, to take rice, boiled in the usual way, and make them like flour pancakes, only use a little flour. They are white and nice.

### WAFFLES.

Beat four eggs, mix flour and milk enough to make a thick batter, using a quart of flour, a table-spoonful of melted butter, a tea-spoonful of salt. Bake in waffle irons, and season with melted butter and sugar, flavored with nutmeg, lemon, or cinnamon. They may be made with a part of boiled rice, or like common griddles.

### GRIDDLE CAKES.

Take a pint of thick milk, or a quart of sour; to the

thick add a pint of sweet milk, a little salt, a tea-spoonful of saleratus, and flour to make a batter. The thinner the batter, if baked well, the more tender they will be. Half a tea-cupful of cream improves them. Butter while hot, and serve with sugar, honey, or maple molasses. For a common sauce, take a tea-cupful of cream, a spoonful of sugar, and half a tea-spoonful of ginger. It is a delightful way of eating them.

### CRUMPETS.

Take three tea-cupsful of raised dough, and work into it half a tea-cupful of melted butter, three eggs, and milk to make a thick batter. Bake in a hot buttered pan in half an hour.

### WAFER CAKES.

These are nice for tea. Take two-thirds of a tea-cupful of butter, the same of sugar, three well beaten eggs, and a tea-spoonful of rose water. Make a stiff batter, and, when well beat and smooth, have your wafer-irons hot and well buttered, then fill them, and close tight; place in the fire to cook both sides at once, and they will be done in ten minutes.

### A RETIRED BAKER'S RECEIPT FOR BREAD.

Take an earthen vessel, larger at the top than at the bottom, put in one pint of warm water, one and a half pounds of flour, and half a pint of malt yeast; mix well together, and set away in a warm place until it rises and falls again, which will be in from three to five hours. Then put two large spoonsful of salt into two quarts of water, and mix with the above; rising, then put in about nine pounds of flour, and work it well; let it rise until light, then make it into loaves. New and runny flour requires one-fourth more salt than old and dry flour. Bake as soon as light.

### GRAHAM, OR DYSPEPSIA BREAD.

Take three quarts of unbolted wheat flour, one quart of warm water, one gill of fresh yeast, one gill of molasses, one tea-spoonful of saleratus. Make two loaves, and bake one hour, and cool gradually. No bread should be put in an oven too hot, as it will prevent its rising as it ought.

### COMMON DOMESTIC BREAD.

Take three quarts of warm milk or water, a tea-spoon of salt, a tea-cup of light, foamy yeast; stir in enough flour to make a thick batter, and let it stand and rise until light. Then, if a little sour, add a tea-spoon of dissolved saleratus; if very sour, add three. Grease four tins, and do up the bread in loaves, after kneading it well, and let it rise again on the tins. When just light enough, bake in an oven or stove well heated, but not too hot. It will be done in three quarters of an hour. For biscuit, work into dough enough for a loaf, a cup of butter, and do up small. If dripping is used, two-thirds of a cup is enough.

### BROWN BREAD.

Take Indian meal sifted, and wheat or rye flour, equal parts, a cup of yeast, and two spoonsful of molasses. Some scald the meal, and others wet it with warm milk or water. Add a little salt, and place it in pans to rise. It should be wet soft, if the meal is not scalded, stirred with a spoon; but harder otherwise.

### TOAST WITHOUT BUTTER.

Prepare bread in the usual way, put in a pan a pint of new milk, and when the milk in the pan boils, have two table-spoons of flour dissolved smooth in a little cold milk, and pour in; add a tea-spoon of salt, let it scald, but not boil, and pour it over the bread.

### MILK TOAST.

Boil a pint of rich milk with a table-spoonful of butter, and one of flour. Have ready in a dish eight or ten slices of bread toasted. Pour the milk over them hot, and cover it until it goes to the table.

### JOHNNY CAKES.

Take a quart of sour milk, thick or otherwise, a tea-spoonful of salt, sifted meal to make a stiff batter, a tea-spoon heaping full of dissolved saleratus, with or without a spoonful of flour. Butter a pan, and bake nearly an hour. For tea, it is improved by adding half a tea-cup of molasses, a little alspice, a spoonful of cream or shortening.

### A WARM LOAF FOR BREAKFAST.

Make as above, put in an iron basin with an iron cover, place in the kitchen fireplace; when the fire is raked for the night, put fire and hot ashes around and over it, and in the morning you will have a nice, warm, brown loaf.

### MUFFINS.

One pound of flour, one pint of milk, a tea-cup of butter, the same of yeast, and two eggs. Bake without tins.

### MUFFINS.

Take a quart of warm milk, half a cup of melted butter, four eggs well beaten, a tea-spoon of salt, a spoonful of yeast, and flour to make a batter. Let it stand covered in a warm place two hours. Grease your rings, fill them half full, and bake moderately.

## DIFFERENT KINDS OF NICE CAKES.

### FRUIT CAKE.

Take one pint of light dough; one tea-cupful of sugar; one of butter; three eggs, a teaspoonful of saleratus, one pound of raisins; nutmeg or cinnamon, to the taste, bake one hour. Let it stand and rise a little before baked.

### FRENCH LOAF.

Three tea-cups of light bread; two cups of white sugar; one cup of butter; three eggs; one nutmeg; one small tea-spoonful of saleratus. Rub the butter and sugar together, and the egg, and lastly the bread and fruit. Bake in a loaf one hour and a half.

### SPONGE CAKE.

Ten eggs; their weight in sugar; the weight of seven eggs in flour. Beat the whites and yolks separately, then add sugar and flour. The last thing before baking, add the juice of one lemon; one tea-spoonful of saleratus.

### COURT CAKE.

Four eggs; two cups of sugar; one of butter; one of buttermilk; half a teaspoonful of saleratus; half a nut-

meg; put them together, and beat them well. Add one pound of fruit, and three cups of flour. When sufficently beat, add the saleratus, and bake nearly an hour

### CUP CAKE.

One cup of sugar; one of butter; three and a half of flour; four eggs and a half a cup of cream; half a tea spoonful of saleratus. Bake in a loaf, or small tins.

### MEASURE CAKE.

Two eggs; one cup of sugar; half a cup of butter; half a cup of cream; two cups and a half of flour; half a nutmeg, and half a tea-spoonful of saleratus. Let it be well beat, and add the saleratus last. Bake nearly an hour.

### CONVENTION CAKE.

One tea-cupful of butter; two cups of sugar; three of flour; four eggs; beat well. Try it, and all kinds of cake, with a fibre from a corn broom, inserted through the middle of the loaf. If nothing adheres it is done, and if there does, let it remain until done.

### POUND CAKE.

One pound of flour; one pound of sugar; one pound of butter; eight eggs; three spoonsful of rose water, or without; beat it well, and bake three quarters of an hour.

### COOKIES.

One cup of cream; half a cup of butter; one and a half of sugar; one tea-spoonful of pearlash; two eggs; wet as soft as you can roll, and bake quick. Caraway seed if you please.

### RICH PLUM CAKE.

Mix two quarts of flour with a pound of sifted loaf sugar; three pounds of currants; half a pound of raisins, stoned and chopped; a quarter of an ounce of mace and cloves; a grated nutmeg; the peel of a lemon cut fine; melt two pounds of butter in a pint and a quarter of cream, but not hot; the whites and yolks of twelve eggs beaten apart; and half a pint of good yeast. Beat them together a full hour. Put in a plenty of citron and lemon. Then butter your hoop or pans, and bake.

### SHREWSBURY CAKE.

One pound of flour; three quarters of a pound of sugar; three of butter; four eggs; beat till very light; bake moderately.

### SOFT CAKE IN LITTLE PANS.

One cup and a half of sugar; the same of butter; eight eggs; and half a nutmeg; or without if preferred.

### A LIGHT CAKE TO BAKE IN CUPS.

Half a pound of sugar; half a pound of butter, rubbed in two pounds of flour; one glass of wine or rose water; two of yeast; one of nutmeg; and fruit if you please.

### QUEEN'S CAKE.

Whip a cup and a half of butter to a cream; add two cups of sugar; eight eggs; flour, to make suitably stiff; beat well, and bake in a good oven not over half an hour. It may be dropped on tins, with currants laid in the tops.

### SCOTCH CAKE.

Stir to a cream two cups of sugar; a cup and a half of butter; put in the juice and grated rind of a lemon. Beat nine eggs to a froth, and stir in; sifted flour enough to make it a stiff batter. If you wish it very nice, add a quarter of a pound of citron cut in thin pieces; almonds blanched and powdered fine in rose water. Bake in pans, or drop on tins two inches apart, with white sugar grated over them.

### A SIMPLE SPONGE CAKE.

Take twelve eggs; two cups of powdered loaf sugar; the grated rind of a fresh lemon, and half its juice; beat to a stiff froth; then add two cups of sifted flour, and bake in a quick oven, but not too hot. It will bake in twenty minutes.

### JUMBLES.

Take six eggs; a cup and a half of sugar; one of butter; beat it to a froth; add lemon or rose water, and flour enough to roll; cut out with a large tumbler, and cut out the middle with the top of a small canister, to leave

a perfect ring. They should be rolled in white powdered sugar, and baked on tins in a quick oven.

### KISSES.

Beat the whites of four eggs to a stiff froth; add the juice of a lemon or a little rose water. Roll and sift half a pound of the whitest loaf sugar: and beat it with the egg. Spread out white paper on tins buttered, and drop a table-spoonful of this mixture on the paper. The oven should be only moderately hot, and when the tops have become hard, remove them. Have a solution of gum Arabic, and dip the lower side of the cake, and join it to another.

### HONEY CAKE.

Three quarters of a pound of honey; half a pound of fine loaf sugar; a quarter of citron; a half ounce of orange peel cut small; of cinnamon and ginger, each half an ounce; four well beat eggs, and a pound of sifted flour. Melt the sugar with the honey, and mix. Roll out the cakes, and cut in any form.

### ALMOND BRIDE CAKE.

Take four pounds of flour, sifted, four pounds of butter, two pounds of loaf sugar, sifted fine, a quarter of an ounce of nutmegs, the same of mace; to every pound of flour put eight eggs; wash and pick four pounds of currants and dry them; blanch a pound of sweet almonds, and cut them lengthwise, very thin; a pound of citron, a pound of candied orange, a pound of candied lemon. Beat the butter with the hand to a cream, then add the sugar, and beat a quarter of an hour; beat your eggs to a strong froth and stir in; then add the flour, mace, and nutmeg, and heat till the oven is ready; at last stir the almonds and currants lightly in, and bake in well buttered pans or hoops. It will take, if the loaves are large, three hours baking.

### COCOANUT CAKES.

Take equal parts of grated cocoanut and powdered white sugar; add the whites of eggs, beaten to a stiff froth; half a dozen to a pound. There should be just

eggs enough to wet the whole stiff. Drop the mixture on buttered tins, in parcels of the size of a cent, several inches apart. Bake them immediately in a moderate oven.

### A CHOICE WEDDING CAKE.

One pound of flour, one of sugar, one of butter, twelve eggs, two pounds of raisins, two pounds of currants, a pound of citron, lemon, nutmeg, and mace, to your taste. Beat it all very light. Flour the fruit, and stir in last, and, if necessary, add more flour. Have one large pan, or two smaller ones well buttered, and put in a layer of the cake, and then one of citron sliced thin, and so on until full. It will need a well heated and steady oven, to bake four or five hours according to its thickness. Let it cool gradually in the oven. Ice it when thoroughly cold.

### SPONGE GINGERBREAD.

A pint of molasses, a tea-cupful of sour milk or buttermilk, a tablespoonful of ginger, two spoonsful of melted butter, two tea-spoonsful of saleratus dissolved, and flour sufficient to roll. Cut it about half an inch thick, and bake in a quick oven.

### SOFT GINGERBREAD.

One cup of cream, one of molasses, a tea-spoonful of ginger, one of saleratus dissolved, a little salt. Bake in half an hour.

### GINGERNUTS.

One cup of molasses, half a cup of sugar, a spoonful of ginger, one cup of butter, half a cup of sour milk, two tea-spoonsful of saleratus dissolved in boiling water, and stirred in after the flour. Make it just stiff enough to roll very thin; cut in small cakes, and bake in a slow oven.

### BAKERS' GINGERBREAD.

Four ounces of saleratus dissolved, and put in a gallon of good molasses, four spoonsful of ginger, mixed with sufficient flour; have four ounces of alum pounded and dissolved in a small quantity of boiling water, kept boiling until wanted, and pour in last. Rub in the flour, two pounds of butter. Make it as soft as can be rolled, and cut in cards.

### PLUM CAKE.

One pound of butter beat to a cream; one pound of sugar; twelve eggs, leave out two whites. Beat separately, and then mix together. Add one pound of flour; one glass of brandy or wine; two pounds of currants; two of raisins; one and a half of citron. Flour the first, and when ready to bake, put in one ounce of mace; two of cloves; half an ounce of cinnamon, and nutmeg. Just as you bake it, add a tea-spoonful of saleratus dissolved, and a table-spoonful of molasses.

### A GENUINE SPONGE CAKE

Seven eggs; twelve ounces of sugar; six of flour; a little rose water; if you please, a spoonful of wine.

### COOKIES.

Six cups of flour; three of sugar; one of butter; one of sour cream; one of sour milk; a tea-spoonful of saleratus, and one of caraway seed.

### FRUIT GINGERBREAD.

Four cups of flour; one of butter; one of sugar; one of molasses; one of milk; four eggs; three tea-spoonsful of ginger; a tea-spoonful of cloves, and nutmeg; half a pound of currants and raisins. Add the fruit last, and bake in pans in an oven not very quick.

### WASHINGTON CAKE.

Beat six eggs very light; add one pound of butter; a pound of sugar; a pint of rich milk or cream a little sour; a glass of wine; a powdered nutmeg; a spoonful of cinnamon; and lastly, a small tea-spoonful of saleratus. Bake in tins or small pans in a brisk oven, and if wrapped in a thick cloth, it will keep soft a week.

### JELLY CAKE.

Make a pound cake with a little less flour than usual. Beat it well, and have rather a thin batter. Lay your griddle in the oven of a stove, and place on it a cake ring well buttered, as large as a dinner plate, or use small muffin rings; have the griddle well buttered, and lay in two large spoonsful and a half of the cake batter; bake about five minutes, and turn; proceed thus until it is all baked, and when cool spread them with jelly, or marme

lade, and put two together; fill a plate, and cut in triangular pieces. It is best when fresh.

### QUEEN'S CAKE.

One pound of flour; one of sugar; three fourths of butter; five eggs; a gill of cream; mace and nutmeg baked in small tins with or without currants, or sultana raisins. Ice them, and flavor the icing with lemon or rose

### INDIAN POUND CAKE.

Take a pint of sifted meal; a half pint of flour; nutmeg and cinnamon. Beat eight eggs; a half pound of sugar; the same of butter; and stir in gradually. Beat well together, and bake an hour and a half. It should be eaten fresh, and is then very nice.

### WHITE CUP CAKE.

Take four cups of flour; two of white sugar; one of butter; one of sour cream or rich milk; nutmeg, cinnamon, and lemon, with five well beaten eggs; and lastly a small tea-spoonful of saleratus. Bake in cups or tins in a moderate oven twenty minutes.

### CRULLERS.

Six eggs; one cup of butter; one and a half of sugar; cinnamon, nutmeg, and rose water. Beat well, and stir in flour enough to roll into any fanciful shape. Fry a light brown in a plenty of lard. When cold, grate over them loaf sugar. Another; one egg; four spoonsful of sugar; three of butter; one cup of cream; salt and spices to your taste. Fry in lard.

### AN EXCELLENT COMMON FRIED CAKE.

One cup of sugar; one of cream; three eggs; cinnamon or nutmeg; a tea-spoonful of saleratus. Cut as jumbles, or in strips, and twisted, and fried in lard.

### EXCELLENT PLAIN CRULLERS.

One cup of shortening; one of molasses, or sugar; one of sour milk; one egg, if convenient; cinnamon, nutmeg, or ginger, a tea-spoonful; a little salt; a tea-spoonful of saleratus, dissolved in half a cup of hot water. Fried as above.

### DOUGH NUTS.

One cup of butter; one of sugar; nutmeg, cinnamon or rose water, and two eggs; worked into a quart bowlful of bread dough, on light sponge; make as hard as biscuit, and let it rise an hour or more; add a tea-spoonful of saleratus to the sponge. When light, cut in squares or balls, and fry six or eight minutes in hot lard. They should be a mahogany brown. The New York "Oley Koeks" are dough-nuts with currants and raisins in them.

## PIES, PUDDINGS, ETC.

### MINCED PIE.

Boil fresh beef perfectly tender, that will slip off the bone. The head and harslet are nice for this purpose. Take out all the hard gristle and bone and tough parts when hot. As soon as it is cold, chop it all very fine, and if you do not want it for immediate use, season it with pepper, salt, cloves and cinnamon, and press it closely into a stone jar, and pour molasses over the top, and when after a few days or weeks it has left the surface, pour on more to keep it nice. To every two quarts of chopped meat, a half a tea-cupful of ground cinnamon, a table spoon of ground cloves, a tea-spoonful of pepper and a table-spoonful of salt will keep it well with molasses poured over it, a year. It is far more convenient to have meat thus prepared for use through the winter than to boil every time it is needed. The proportions should be a third meat, and two-thirds apple, chopped very fine, those a little sour are best. A good mince pie is a general favorite, and formerly brandy was deemed indispensable in giving them the right flavor. But we are happy to inform our temperance friends and others, that a mince pie can be made equally good without either wine or brandy. Add a good quantity of box raisins, and season high with spices and molasses, adding water sufficient to keep them moist, made up in a rich nice paste, and there will be nothing wanting in flavor or quality. They should be baked one hour in a moderate oven.

### DRIED APPLE PIE.

Stew the apples soft, turn them into a pan and mash

them fine. Add half the peel of a lemon cut fine, or a little grated nutmeg, a sprinkle of salt, molasses or sugar to make them quite sweet. Bake them in a rich paste a little over half an hour. This will be quite as good as fresh fruit.

### GREEN APPLE PIE.

Stew and strain the apples, grate the peel of a fresh lemon, or rose water and sugar, to your taste. Bake in a rich paste half an hour.

### A BUTTERED APPLE PIE.

Pare and slice tart apples, lay them in a rich paste, and bake half an hour. When done, raise the top crust and add sugar, a little butter, and flavor with lemon, rose water, nutmeg, or cinnamon. They are best when fresh baked.

### CURRANT PIE.

Take green currants, pick and wash, add one third their quantity in sugar and raisins. Add half a teacup of water to each pie, and a single handful of flour sprinkled over the fruit. They are sometimes made without any other fruit. Dried apples stewed, are a good substitute for raisins, and if used alone, molasses is better than sugar. Pies made of berries are better without spices

### CHERRY PIE.

Stone your cherries, that you may be sure they are free from worms. Lay your paste in a deep dish, and add a good quantity of fruit; fill the dish with molasses, with a handful of flour sprinkled over, then a nice paste, and bake more than half an hour. If sugar is used, you will need water and flour. This makes the gravy very rich, and the pie delightful.

### RHUBARB PIE.

Take the tender stalks of the rhubarb, strip off the skin and cut the stalk into small pieces. Line your plate with a rich paste, and put in a layer of rhubarb and a thick layer of sugar, and so on until filled; a little lemon peel improves the flavor. Cover with a crust cut in the middle, or prick it that the juice of the pie may not run out. They must be baked an hour in a slow oven. Some stew it beforehand, and in that case they will bake in half an hour. But if they are wanting in sugar, they

will not be good; see that there is no deficiency in this respect, and they are very nice.

### PUMPKIN PIE.

Pare and stew the pumpkin soft, let it remain over the fire, stirring it often until quite dry. When cool strain through a sieve or fine cullender, and add milk about one quart to one of pumpkin. Let it warm, after they are strained together, then add molasses or sugar, a little salt, nutmeg, cinnamon, or lemon, with a spoonful of ginger and an egg or two with a handful of flour. Bake in a hot oven nearly an hour.

### POTATOE PIE.

Boil common or sweet potatoes until well done. Mash and strain them; to a pint of the potatoes, add a pint and half of milk, half a tea-cup of sweet cream, or a little melted butter, two eggs, and sugar, salt, nutmeg, or lemon, to the taste.

### APPLE CUSTARD PIE.

Grate four sweet apples for every large pie, a pint and half of milk, two eggs, sugar, a little salt, nutmeg or lemon, to the taste. Bake as a custard pie, in a quick oven.

### LEMON PIE.

Take one lemon, slice very thin, lay it in a rich paste. Sprinkle over it one spoonful of flour, one tea-cup of sugar, fill the pie nearly full of water and cover. Bake in a slow oven nearly an hour.

### RED SUGAR BEET PIE.

Pies made of the red sugar beet are said to be delicious; somewhat resembling rhubarb pie in flavor, though more rich and substantial. It is seasoned with vinegar, sugar and spices to suit the palate. The root may be used without boiling, being chopped fine. Prepare the crust, and bake as you would a green apple pie.

### COCOANUT PIE.

Grate the white part and mix with milk. Let it boil slowly eight or ten minutes. To a pint and half of cocoanut, add a quart of milk four eggs, half a cup of sweet cream, two spoonsful of melted butter, a cracker rolled fine, and half a nutmeg. The cocoanut should cool before the eggs and sugar are stewed in. Bake in a deep plate like a custard in a quick oven.

### BUTTERNUT PIE.

Twelve butternuts dried and pounded, made like a custard pie, in other respects, is rich and nice.

### A PLAIN CUSTARD PIE.

The crust of all custard pies, or those made like custard, should be made with the addition of a little sour milk and saleratus, to make it light, and then it will never be soaked and wet at the bottom. It is a great improvement. To every two pies, allow five eggs, sugar, nutmeg, lemon, salt, to the taste, and bake in a quick oven.

### TOMATOE PIES.

Take ripe tomatoes, skin and slice. Sprinkle over a little salt, and let them stand a few minutes, pour off the juice and add sugar, half a cup of cream, one egg, nutmeg, and cover with a rich paste, and bake in a moderate oven over half an hour. This makes an excellent and much approved pie.

### TARTS.

Cut out the paste with a tumbler, then cut strips of paste to lay round the top neatly, and press it in the middle to form it deeper, then lay in sweetmeats, &c., and bake on tins.

### ORANGE OR LEMON TART.

Cut in slices and boil six large lemons, or oranges, with a little salt, two or three hours until perfectly tender. Then take six pippins, or other good apples, pare, quarter and core, and boil them until they begin to break, then put them together with a pound of sugar, and boil together a quarter of an hour. Lay this in a puff paste, rich and nice, and sift over them superfine sugar and bake, and they will be delightful.

### EGG PUDDING.

One quart of milk, nine eggs, nine spoonsful of flour, a little salt, put in a bag and boil in boiling water one hour and a half. Use a liquid sauce or one made of butter sugar and nutmeg mashed together.

### FLOUR PUDDING.

One quart of milk scalded. Dissolve a pint and half of flour with cold milk and two spoonsful of sweet cream, and when free from lumps, stir it into the scalded milk.

Beat seven eggs, a little salt, sugar to your taste, half a nutmeg or cinnamon. It may be either baked or boiled It takes two hours to boil, and an hour and a quarter to bake. If boiled the bag should be only two thirds full, that it may swell. It must be put in boiling water and kept boiling. It must be turned in ten minutes or it will be heavy. If baked, and raisins are used, they should not be put in until the pudding has cooked enough to thicken, or they will settle at the bottom Flour pudding should be eaten as soon as cooked, or they will fall. Serve with a nutmeg sauce made as above.

### CREAM ALMOND PUDDING.

One quart of sweet cream. Beat eight eggs, and mix with them eight spoonsful of flour, one quarter of a pound of almonds; when settled, add one spoonful rose water, half a nutmeg, a little cinnamon, and beat well together. Wet the bag, or flour the inside, and boil an hour and a half. Serve with melted butter and sugar.

### POTATOE PUDDING.

One pint and a half of boiled mashed potatoes, a teacup of sugar, half a teacup of butter, or sweet cream, one cup of flour, one quart of milk, and four eggs. Flavor with lemon peel, nutmeg or rosewater, a little salt, and bake one hour or more.

### PLUM PUDDING BOILED.

Three pints of flour, six eggs, one pound of plums, a teacup of chopped beef suet, a teacup of sugar, one pint of milk. Mix the whole together. Flour the bag, and boil three hours. Serve with a rich sauce.

### A PLAIN RICE PUDDING.

Boil a pint of rice; add a quart of new milk, half a cup of butter, four spoonsful of sugar; boil them up together and let them partially cool. Beat five eggs well, and stir in, and, if raisins are added, let them be stirred round, after it has partly cooked, that they do not settle at the bottom. Flavor with salt, cinnamon, or nutmeg, and bake one hour.

### PUFF PUDDING.

Take six eggs, six spoonsful of flour, one quart of milk, and half a tea-spoonful of saleratus. Bake twenty

minutes. Serve with sauce as soon as baked. Very light. Some bake in cups and turn out in a dish.

### A BOILED RICE PUDDING.

Boil a pint and half of rice with half a pound of raisins; when the rice is soft, if there is water remaining, pour it off, and add a quart of rich milk. Let it boil five minutes, and then add four spoonsful of sugar, and two eggs well beat, stirring it until the rice and eggs are well mixed. Season with a little salt, nutmeg or cinnamon, and it makes an excellent dish, and one easily made. It should boil five minutes, and be stirred often.

### A RICE PUDDING, GOOD WITHOUT EGGS.

A tea-cup of dry rice, to a quart of milk. Season with a little salt, sugar, nutmeg, and if you please raisins, and bake two hours. It will be very nice.

### ENGLISH PLUM PUDDING.

Soak a pint of crackers in a quart of milk, the crackers should be rolled; when they have become soft, add half a tea-cup of melted butter, four spoonsful of sugar, a gill of wheat flour, half a wine glass of wine, and half a grated nutmeg. Beat five eggs to a froth, and stir them into milk. Add a quarter of a pound of seeded raisins, the same of Zante currants, and two ounces of citron cut in strips. Bake or boil two hours.

### ORANGE PUDDING

Grate two large oranges, and squeeze their juice. Beat six fresh eggs, and stir them into a tea-cup of melted butter, and the same of white powdered sugar, after which add the orange, with half a pint of cream, and lay in a rich puff paste in a deep plate or pudding dish, and bake like custard. Lemons may be used in the same way.

### QUINCE PUDDING.

Pare, core, and chop, four large quinces; boil until perfectly soft, then mix with a pint of cream, a tea-cup of sugar, six eggs well beat, and a glass of rose water,

and a little salt. Lay it in a buttered dish, and bake an hour or more.

### SAGO PUDDING.

Soak six table-spoonsful two hours in cold water, then boil it in a quart of milk till quite soft. Stir in half a tea-cup of butter, and one of white sugar, and let it cool Beat eight eggs very light, and stir them into the sago, &c. Season with lemon, rose water, or nutmeg, and add currants well floured, or raisins. Stir the whole, and lay in a buttered dish, and bake in three quarters of an hour. It may be served cold.

### "BIRD'S NEST" PUDDING.

Take eight or ten pleasant apples, and dig out the cores, leaving them whole. Prepare a custard, six eggs to a quart, flavor with lemon, orange, or nutmeg, and a little salt, and when the apples are laid in a pudding dish, pour the custard over them, and bake half an hour

### BAKED BREAD PUDDING.

Cut slices, or the broken pieces of bread are equally good, soak in milk until soft. Then add two eggs to a quart, a little salt, or butter, lemon peel, nutmeg, or cinnamon, and sugar. Bake an hour. This is wholesome, and best for common use.

### BAKED INDIAN PUDDING.

Scald the milk, and stir in the sifted meal to make a batter not very thick. Then add two spoonsful of flour, molasses to your taste, a little salt, lemon, nutmeg, or cinnamon, and bake two hours and a half. Made in this way, it is quite as good as when made with eggs.

### TO BOIL RICE WHOLE.

Have a quart of water boiling hot, with half a tea-spoon of salt. Wash a pint of rice and throw in, let it boil twenty minutes. If the water is not evaporated, pour it off, and let it stand on coals two minutes. It is then ready for the table. Serve with a sauce flavored with nutmeg.

### A BOILED APPLE PUDDING.

Boil dried apples nearly done. Save a tea-cup of the juice of the apple, for a sauce. Chop them, and mix with soaked bread, and boil in a bag. Make a sauce of melted butter, sugar, and flour, with enough of the apple juice to give it the flavor of wine, and spice with nutmeg. It is excellent.

### APPLE DUMPLINGS.

Lay into rolled paste, apples quartered and cored; roll up, and boil in a cloth one hour. Serve with a sauce made of melted butter and sugar, flavored with nutmeg. Another method. Lay the apples in a small kettle with water sufficient to boil them tender, with the paste over. Cover it close, and boil half an hour. Serve with sauce. Another. Lay the quarters in paste cut round, and tie up in cloths to make them like "snow balls." Serve with the same sauce.

### BAKED APPLE DUMPLINGS.

Take a pint of stewed apple sifted, those that are a little tart are best, two cups of sugar, eight eggs, half a cup of butter, one quart of milk, and rose water, lemon nutmeg, or cinnamon to your taste. Bake one hour.

### ICE CREAMS.

Mix two table-spoonsful of arrow root, powder or fine starch, with milk sufficient to make a thin paste, stirring it till perfectly smooth. Boil together a pint of cream and a pint of milk, and, while boiling, stir in the preparation of arrow root, and let it boil again; then take it off and stir in half a pound of loaf sugar, and let it boil again. If vanilla is preferred, take the half of a bean, split it in pieces, and boil it in a little milk to extract the flavor, and stir in with the arrow root; but if lemon, add a few drops after it is boiled, or, if strawberry, express the juice of a quart of ripe strawberries, and add to the powdered sugar, to boil with the whole. Then strain and put in a freezer, placed in a tub that has a hole in the bottom to let out the water, and surround the freezer on all sides with broken ice and coarse salt. While

freezing, stir it well half an hour, scraping it down from the sides. When frozen, transfer it to a mould, surround it with fresh salt and ice, and freeze it over again. Another method. One pint of cream, three pints of new milk, one pound of loaf sugar, two lemons, and half of a vanilla bean. Boil and stir the sugar in gradually. If you have no lemon, use four eggs. Freeze as above.

### SNOW CREAM.

Beat the whites of four eggs to a froth; and stir in two spoonsful of white sugar; flavor with rose water or lemon; add a pint of thick sweet cream; and beat the whole together, to a froth. This is to be served with a desert of sweet meats.

### WHIP CREAM.

Take a pint and a half of cream; the whites of three eggs; white sugar to your taste; and a part of the juice of a lemon; then whip it with a whisk, made of a bunch of quills, or in a whip churn; flavored with the rind of grated lemon or rose water; and as the foam rises, lay it into jelly glases. If preferred, the glass may be half filled with jelly, and the whip poured over it.

### LEMON CREAM.

Take a pint of thick cream; the yolks of two eggs well beaten; a cup of white sugar; and the rind of a lemon cut thin; boil it up; then stir it until almost cold; put the juice of a lemon in a dish, and pour the cream upon it, stirring well until cold. Serve in a large glass dish, or in custard cups, either alone or with sweetmeats.

### ORANGE CREAM.

Pare and squeeze two oranges on a cup of finely powdered sugar, with half a cup of water. Beat four eggs well, add, and beat them together some time. Strain the whole through flannel into a sauce-pan; set it over a gentle fire, and stir it one way until thick and scalding hot, not boiling, or it will curdle. If lumps of sugar are rubbed hard on the lemons before they are pared, the flavor will be better extracted; or they may be grated. Serve as a custard in jelly glasses.

### SNOW CUSTAD.

Make a rich custard; eight eggs to a quart of new milk; a gill of sweet cream; a little salt; and flavored with lemon, nutmeg, orange, or rose water; boil until just thick, and lay in a dessert or pudding dish with a whip over the whole. Serve as you would a pudding

### GOOSEBERRY OR APPLE CUSTARD.

Boil your fruit; pulp it through a sieve; and season with sugar and flavor the apple with grated lemon or nutmeg. Lay in a thick layer of the fruit in a dish, mix a pint of milk; a pint of sweet cream; the yolks of two eggs; and scald it over the fire, stirring it; add sugar to the taste; and let it get cold. Lay it over the fruit with a spoon, and over the whole a whip. Some prefer the whip made the day before.

### CHARLOTTE DE RUSSE.

Take six eggs to a pint of milk; sugar to sweeten it, strain into it an ounce of dissolved isinglass; when baked let it cool, make a whip and mix with the custard, cool it in forms. Lay in the bottom of the dish thin slices of sponge cake alternately, with jelly around the dish.

### TRANSPARENT LEMON JELLY.

Pare two dozen as thin as possible. Put eight lemons with the rinds into hot, not boiling water; cover it three or four hours. Rub some loaf sugar on the rinds before peeling, to extract the flavor, put in a china dish with a pound and half of fine sugar, then add the water and three quarts of boiling milk; mix and pour through a jelly bag until clear.

### JELLY FROM FEET.

Boil four calves feet, when they have boiled to pieces, strain through the cullender, when cold take off the grease. There should be two quarts of the jelly, put this in the skillet, add one quart of white wine, one pound and a half of powdered white sugar, the rinds of two lemons. Wash the outside of eight eggs, crush shells and all and put them in, stir it occasionally until it is melted, but do not touch it

after. When it has boiled to look quite clear, then set a pitcher under, and if you choose, place it afterwards in moulds. The bag should be made of cotton.

### BLANC MANGE.

Break one ounce of isinglass in very small pieces and wash well. Pour on a pint of boiling water, next morning add a quart of milk, and boil until the isinglass is dissolved and strain it. Put in two ounces of blanched almonds pounded, sweeten with loaf sugar and turn in the mould Stick thin slips of almonds all over the blanc mange and dress around with syllabub, or whip cream.

### FLUMMERY.

Four calves feet well cleansed, add four quarts of water and boil down to one. Strain it, and when cold. take off the top and the sediment. Then add a pint of cream, a little rose water or lemon, sweeten to your taste, boil up and pour into cups to stiffen.

### ANOTHER LEMON JELLY.

Pare four lemons, squeeze the juice and strain it, put the rinds and juice in a quart of water and sweeten with loaf sugar to your taste, add the white of six eggs beat to a froth. Set it over the fire and stir until it thickens, but not to boil. When cold strain through a sieve, put on the fire, add the yolk of the eggs, stir till thick, and serve up in glasses.

### ANOTHER BLANC MANGE.

Take one ounce of isinglass, two quarts of milk, the peel of two lemons, sugar and spice to suit the taste. When dissolved partly, bring the whole to a boiling heat, strain it, and when nearly cool, stir it well to raise the cream so that it will rise while cooling. Pour it into moulds first wet with cold water. It is best to make it the day before it is used; if it does not slip out easily, wrap a cloth wet in hot water around the moulds, then loosen it with a knife and turn out into glass dishes. It may be set to cool in teacups or wine glasses, and if you prefer it, may be stained, green, with the juice of spinach, yellow, with saffron, red, with cochineal, infused a half hour in a little brandy

### PLUM AND CHERRY CHARLOTTE.

Stone a quart of ripe plums or cherries, and [illegible] them with a pound of brown sugar. Cut slices of bread and butter, and lay them round the sides and in the bottom of a large deep dish. Pour in the fruit boiling hot, cover the bowl, and set it away to cool gradually. When quite cold, serve with sweet cream. This is very nice in hot weather

### RASPBERRY CHARLOTTE.

Take a dozen of oblong sponge cake, commonly called Naples biscuit. Spread over each a thick layer of raspberry jam, and place them round and in the bottom of a glass bowl. Take a pint of cream and eight spoonsful of raspberry, or currant jelly, and beat together, and fill up the bowl with it. If you have not cream, take the white of six eggs, and six spoonsful of jelly, and beat very light in the same way. A charlotte may be made with any kind of fruit jelly, marmalade, or jam. It can be prepared at short notice, as it is a favorite dish.

### CONVENIENT TABLE JELLIES.

Use three good sized lemons cut in thin slices, the skin off from one. Take one pound of white sugar, two quarts of cold water, two ounces of isinglass previously soaked half an hour, spices to suit the taste. If you wish it transparent add the white of three or four eggs. Stir it well, and boil the whole one minute, then pour through a jelly bag, ten inches across, narrowing to a point at the bottom. The liquid that runs first should be poured back until it runs clear. For wine jelly, add one pint; the liquid from preserves and fruit jellies, may be used according to taste. Put into glasses or moulds previously wet; when cold it is ready for use.

### TAPIOCA PUDDING.

To one pint of water, add a teacup of of tapioca, and soak over night. In the morning add two beaten eggs, three pints of milk, and bake as any other. Another. Half a pint of tapioca dissolved in a quart of milk, while boiling. Add six eggs when nearly cold, with nutmeg, or cinnamon. Bake ten or fifteen minutes.

### APPLE CUSTARD.

Pare core and slice twelve pippins. Boil a pint of water, a pound of loaf sugar, and twelve cloves, and skim. Put in the apples and stew until the liquid is nearly gone. Lay them in a deep dish, take out the cloves when they are cold, pour in a quart of custard, and let it cook by setting the dish in boiling water until it sets. The same with quince but more sugar.

### NELSON'S PATENT "OPAQUE GELATINE."

Soak one ounce of opaque gelatine in half a pint of cold water ten minutes. Then add the same quantity of boiling water, stir it until dissolved, and add the juice and peel of two lemons, with wine and sugar to make one quart. Stir in the white and shell of an egg, well beat together. Then boil it five minutes without stirring it. Remove it from the fire two minutes and strain through a close flannel bag. This is highly recommended for blanc mange, and all kinds of jellies. It is said to be in every respect, better and cheaper than isinglass or other gelatines. One ounce will form a quart of calves foot, mange, lemon, and other jellies sufficiently firm to turn out of moulds. It is also used in soups with less meat.

### FLOATING ISLAND.

Take the white of an egg or more as you want; beat to a froth, add a glass of currant jelly, beat them together until a spoon will stand up in it. Drop a spoonful at a time on a glass bowl of sweet cream.

### ARROW ROOT BLANC MANGE.

Take a tea-cupful of arrow root, dissolve in a little cold water. Take half a pint of new milk, sweeten with loaf sugar to your taste, or very sweet, add the grated peel of a lemon, a grated nutmeg and pounded mace, and boil until highly flavored. Strain into a pint of milk and half a pint of cream; add two thirds of a cup of sugar, and boil ten minutes; then strain it boiling hot into the arrow-root, after the water has been poured off, stir it constantly until thick, and then put in moulds to congeal.

### COLD CUSTARD.

Soak a piece of rennet in wine, and you will be able to have custard at any time without eggs or cooking it. Sweeten and flavor a quart of sweet rich milk, if you like, add a little salt. Then stir in a spoonful or two of the rennet wine, and turn into cups. When it is thick like a rice custard, grate over a little nutmeg, and you will have a delicate custard.

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## RULES FOR PRESERVING.

All delicate fruit should be done gently, and not allowed to remain more than half an hour before it is laid on a dish to cool, and then returned. Continue so until transparent. Put no more in the pan than can lie without crowding. A pound of sugar to a pound of fruit, is a general rule for acid fruits. Preserving kettles should be broad rather than deep. The flavor of the fruit is preserved by covering the kettle. If sweetmeats become candied, set the jar in water, and let it boil around it. Tissue paper cut to nicely fit over the top, is better to preserve from mould, &c., than white paper wet with brandy. To clarify sugar; to every eight pounds of sugar, stir into two quarts of water the whites of two eggs, and mix with the sugar. While it is melting, stir frequently. Then place it over a moderate fire, and as it boils take off the scum. When clear, put in your fruit as above. Large fruit that is done whole, should first be boiled in a thin syrup, or it will shrink too much. Small fruit is best to stew half the sugar over it, and let it stand a day or night.

### QUINCES.

Pare, and cut in eight quarter pieces; boil until tender in a little water; turn them in an earthen vessel, and let them remain one day. Then boil and strain, the parings and pits or seeds, which will afford a rich jelly liquid; to this, add your sugar, clarify, and when hot, lay in your fruit, and scald it an hour gently. Skim it out, and boil the liquid until sufficiently thick, and pour over. If you have but few quinces, prepare one third, or half the quantity of

the same sized apples cut in the same manner, and cook in the sugar syrup first, and lay in the bottom of the jar, and they cannot be told from the quince in flavor. If you wish to make quince jelly do not boil the cores with your preserves, but reserve them for this purpose, and add a few pieces of the quince, to give it a higher flavor. It will make a rich, clear, delightful jelly, with the usual amount of sugar made in the usual way. Some prefer quinces cut in rings.

### PEACHES.

If you preserve them whole, they shou d be gathered before they are fully ripe, and before they part from the stone. Pare them, and boil in the syrup gently, until they are tender. If in quarters, crack the pits of half the peaches and boil in the syrup; strain and cook in the usual way. Put up in jars and glasses. Some prefer them cooked in a little water, and the syrup poured over them hot. Jelly may be made in the usual way; mash them, and strain through a Jelly bag. Allow a pint of juice to a pound of loaf sugar, and if it does not readily congeal, dissolve an ounce or more of isinglass, and strain, and add. Put up in tumblers. The kernels should be cracked, and half of them boiled with the fruit.

If you wish them preserved in brandy, they should be gathered before they are ripe; rubbed with flannel, pricked with a large needle to the pit, in several places, and run the needle down the seam. Put them in cold water and boil them very gently until tender. Take them carefully out, fold them in a table cloth or soft flannel. Have ready a pint of brandy; a pint of the juice, in which they were boiled; a pound of loaf sugar. When the peaches are cool lay them in a jar and pour over them. They may be used as a dessert.

### PEARS.

These look best if moderate size, preserved whole, pared, with the stems on. Make a thin syrup, and boil them tender. If boiled too fast, they will break. They will be sufficiently cooked in half an hour. If you wish them nice, let them lie in the syrup in a jar, or tureen, two days. Drain the syrup from the pears; add more sugar; boil

ten minutes; skim, and put in the pears; simmer them till they are transparent. Take them out; stick a clove in the end of each; and lay in a jar when cool. Then pour over the warm syrup. For common use, they are best done in quarters, boiled tender in a little water; then add half a pound of sugar to a pound of pears to the liquor, and simmer them gently half an hour. They may be flavored with lemon if preferred. They are nice for common use, baked. They may be done with the stems on and pared, or with the skins. Put them in a tin with half a tea-cup of molasses, and the same of water, or the same of sugar and water. They will bake in an hour.

### PLUMS.

May be preserved nice with the skins on or off. If on, they should be pricked at the top and bottom with a large needle. If you take them off, turn boiling water over them Plums require a pound and a half of sugar to a pound of fruit. Prepare your syrup thick, and lay in your plums to simmer, not to boil; let them remain in a scalding state until cooked through, at least two hours. Then skim out and boil the liquor down about an hour. It must be thick to keep well. The flavor will be much improved by boiling in the syrup, half a pint of the kernels cracked. They must be strained out. Plums may be hardened, by scalding them in alum water; and when drained, pouring the hot syrup over them every day for a week, but if done with care they will remain whole preserved as above.

### EGG PLUMS WHOLE.

Take them before they are perfectly ripe, prick them all over with a fork, leave on the stems. To three pounds of plums, allow three pounds and a half of white broken sugar; a half pint of clear hard water; put in your plums and hang over a moderate fire; boil gently and skim. As soon as they begin to crack or shrivel, take them out with a spoon one at a time, and lay them in dishes to cool. Smooth the skins down with your fingers if broken or ruffled. Lay them, when cold in the syrup, which should be slowly boiling, and let them simmer till they are clear, but not till they break. Put them up in jars.

### APPLES.

These make as nice a sweetmeat as any other fruit. They may be done whole by paring them. Boil them in just enough water to cover them, half an hour slowly. Then pour the apple water on the sugar, and boil till clear and thick, skimming it carefully; if you add lemons, have them ready, and lay in with the apples, and let them boil till the apples are tender and clear, but not till they break. When cold, put them in jars. They look well cut in halves; preserved with lemons or oranges, or alone, with a little of the essence or oil of lemon. If in halves or quarters, boil in the syrup till clear.

### CRAB APPLES.

These should be ripe; simmer them till the skins come off easily; take them out; peel, and core them with a small knife, and not break them. Allow a pound and a half of sugar, to a pound of fruit; and half a pint of water. When hot and skimmed, lay them in and boil until clear and tender. Spread them on dishes to cool, then place them in jars, and pour the liquor over. Some think their flavor improved by lemon peel boiled with them.

### PINE APPLES.

Take those that are ripe and fresh; pare off the rind, and cut in slices half an inch thick. Sprinkle between them powdered loaf sugar; and let them remain till the next day. Then with the usual syrup, boil until tender, putting them in when it is cold. Keep in a cool place.

### CITRONS AND WATER-MELON RINDS.

To preserve their greenness, boil them with a layer of vine leaves between each layer of water-melon rinds, pound, and cut in pieces, with water enough to cover. Some add a few pieces of alum. Boil two hours with a thick cloth, or a plate to fit in, over them. Spread on a dish to cool. Then boil in a syrup two hours with the juice and rind of one lemon. Lay the rind in jars and cover.

### PUMPKIN.

Cut it in pieces of two inches in breadth, and four in length. Soak it in lemon juice and sugar, or vinegar, over

night. Next day prepare a syrup and lay in the pieces, and juice; and boil slowly until tender and transparent, but not long enough to break or lose its form. Boil lemon parings, cut in strips, with it. Spread the pieces to cool. Strain the syrup, and put up in glass jars.

### APRICOTS.

Take those that are ripe; scald, peel, and cut in half, and extract the stones. Put them in layers with sugar between, in a tureen or dish, and let them stand all night. Boil in a syrup a quarter of an hour, and spread to cool. Then boil again in the same syrup, and put away in jars.

### MARMALADES.

They may be made of any fruit without seeds. The fruit should be boiled very soft with some of the kernels; and all of the pits of quinces, and parings, boiled and strained, added to the sugar. Mash to a fine pulp, and add sugar in the proportions of the sweetmeats, and simmer thick. It should be a smooth thick mass. Put up in tumblers.

### JELLIES.

Almost all kinds of fruit will make a nice jelly. Plums, cherries, currants, grapes, quinces, peaches, apples, oranges, are all delicate and very nice. They should be boiled in considerable water very tender, with the seeds, and parts of the kernels. Then strained through a jelly bag, and allow a pound of sugar to a pint of juice. Boil a while, if boiled too long, it will not form. Isinglass may be added if there is a failure, which will be a remedy.

### RASPBERRY JAM.

To each pound of fruit, allow three quarters of a pound of fine loaf sugar. Mash the berries and break the sugar. Mix together, boil, stir, and skim, the jam will be done in half an hour. Put it warm in glasses, and tie up with papers over the top. Other jams are made in the same way.

### TO DRY CHERRIES AND PLUMS.

Stone them, and half dry them. Pack them in jars, strewing sugar between each layer. They are very nice in pies, and otherwise.

### APPLE BUTTER.

Take any kind of berries or other fruit. Allow half a pound of sugar, to a pound of fruit; boil till reduced one fourth. Nice for children instead of butter.

### FROSTED FRUIT.

Beat the whites of eggs, and dip in the fruit; then lay it in finely powdered sugar; lay them on a pan with white paper under, and set them in an oven nearly cool to dry. When the icing is firm, pile them on a dish and set in a cool place.

### TO KEEP APPLES FRESH A YEAR.

Dry sand; and dry your barrel. Put in a layer of apples, and a layer of sand, and so on until full; cover it tight; and keep where they will not freeze in winter. They will be fair, and fine flavored the next summer.

### TO KEEP GRAPES, PLUMS, ETC., THROUGH THE WINTER.

Put them in layers of cotton, until your jar is full; cover close, and keep from frost. It is said they will keep immersed in molasses.

### ITALIAN MODE OF PRESERVING STRAWBERRIES.

Place as many berries as will form a layer at the bottom of the dish, and sprinkle on powdered loaf sugar; then another layer and sugar again. When your dish is sufficiently full, squeeze over them the juice of a fresh lemon; stir them round before serving, that they may imbibe the lemon and sugar. They are said to be truly delicious.

### STRAWBERRIES FOR TEA.

They should have nearly their weight in sugar, and a weet rich cream, to serve with them, and there is no greater uxury.

### PEACHES FOR TEA.

They should be pared and cut in slices, and cover with sugar and sweet cream.

### PEARS FOR TEA.

Very ripe soft pears, may be prepared like peaches and are very nice.

Blackberries, raspberries, currants, and whortleberries should be used like strawberries.

### TOMATOE FIGS.

Take six pounds of sugar to one peck or 16 lbs. of the fruit. Scald and remove the skin of the fruit in the usual way. Cook them over a fire, their own juice being sufficient, with the addition of water, until the sugar penetrates and they are clarified. They are then taken out, spread on dishes, flattened and dried in the sun. A small quantity of the syrup should be occasionally sprinkled over them while drying, after which, pack them down in boxes, treating each layer with powdered sugar. The syrup is afterwards concentrated and bottled for use. They keep well from year to year, and retain surprisingly their flavor, which is nearly that of the best quality of fresh figs. The pear shaped, or single tomatoes answer the purpose best. Ordinary brown sugar may be used, a large portion of which is retained in the syrup.

### ORANGE SYRUP.

This syrup is so easily made, and can be used so constantly with advantage, that no housekeeper should be without it. Select ripe and thin-skinned fruit, squeeze the juice through a sieve; to every pint, add a pound and a half of powdered sugar; boil it slowly, and skim as long as any scum rises; you may then take it off, let it grow cold, and bottle it off Be sure to secure the corks well. Two table spoons of this syrup, mixed in melted butter, make an admirable sauce for a plum or batter pudding; it imparts a fine flavor to custards, and a tea-spoonful introduced into a glass of punch adds much to its deliciousness.

### REGULATIONS FOR A DINNER TABLE.

Let the cloth be laid on accurately, observing to have the middle fold exactly through the centre of the table. When even, lay the plates, one at each end, and around the sides at equal distances from each other. Lay the napkins neatly folded near each plate. Place the knives and forks that the ends of the handles come even with the edge of the table, the blade towards the plate. The carving knives and forks at each end, and by those dishes that are to be carved.

Then place your tumblers about three inches from the edge of the table at the right side of the plate. Your table spoons as many as are needed, may be crossed and laid each side of the carver's plate. Let the castor be well filled and clean and placed in the centre. The salt stand well filled, the spoons perfectly bright and placed at convenient distances for use. Let there be nothing wanting that may be needed on the table.

### FOR PLACING THE MEATS AND VEGETABLES.

Soup or fish should always be set at the head of the table. Or if you have boiled and roasted meats, place the boiled meat at the head. The principal dishes go at the head, and if there are one or two smaller ones, place them opposite to each other at the foot

If there are four, place the two smallest at the sides. If there are five, put the smallest in the middle, and the other four opposite each other at the head, foot and sides, and so on.

The vegetables should be placed in a strait line at the sides. A middling dinner well served up, the dishes placed at proper distances, and well matched, has a more pleasing aspect, and is more acceptable than double the quantity crowded and in confusion. Great attention should be paid to these rules.

### FOR SERVING A DINNER.

When every thing is in perfect readiness, and the chairs are placed round the table, open the door and announce dinner in a pleasant kind tone. When the company rise to go out, stand by the door holding it open until they have all passed through, then shut the door and follow to the dining room. If there are covers, remove them as soon as the company are seated. Take them off with the left hand turning them up quick that no water may drop from them. Put them on a side table, to be taken from the room when convenient. Always go to the left hand when you are serving those at table, except to pour water, that should be done at the right. Be attentive to the wants of those at table. Notice if each one is well helped, and be ready to hand any thing that is wanted. Do not wait to be asked for every thing by the company. If you keep a sharp eye on the table you will see many things wanted that is not

asked for, such as bread, vegetables, sauce, &c As soon as you perceive the signal to remove the first course, take a knife tray and remove all the knives, forks, spoons, and ladles from the sauce boats first; then the plates. Begin at the bottom dish on the left side, and take all before you as you proceed until you come to the bottom again. When all is cleared away, take a fork and plate and take up all the pieces of bread from the cloth. Then take another plate and table-brush or a clean towel rolled up, and begin at the bottom on the left side, brushing off clean all the crumbs round the table. If there are finger glasses to be used place them half filled with water at the right side of each person. Put on the piles of plates at the head and foot according to the dishes requiring them. Place the pies at each end, custard and puddings at the sides, with a knife and fork on each pie, and spoons for the side dishes. Place the cheese in the centre, if in a tray; if there are two, one at each end.

PUTTING ON THE DESSERT. If the cloth is to be removed before serving the dessert, first take off the finger glasses, begining at the bottom, then the plates, dishes, &c., in the same order as before; then the napkins and cloth. Then take a towel and wipe off the table. and proceed to put round the plates. If you have cake, place that in the centre, the others in a straight line, the sugar basin and water pitcher between. If you have side dishes, place them at equal distances to match in size and color as near as possible. When you have all your dishes on the table, put a knife to your cake, and half a dozen large spoons to serve the dessert with. When there is blanc mange or ice cream, lay a small pile of plates at the top and bottom, and when all are served, then proceed to take all the dirty things from the room with as little noise as possible. In serving a table it should be done with a light quick step, but never with bustle or hurry. Never seem impatient to leave the room, but quietly wait, and be kindly attentive.

## A FEW GENERAL DIRECTIONS FOR CARVING, ETC.

The heads of fish and fowl, pigs, hares, &c., should be placed at the left hand of the carver. The thick end of joints also. If the platter has a place for gravy in one end place it that it may come to the right hand. This should be done when the meats are brought to the table, that they need not be turned. The carving knife should be in good order, with a keen edge. In using it no great strength is required. Practice will render it easy to carve the most difficult articles. It is well to notice how a good carver proceeds when a joint or fowl is before him. The fleshy joints are to be cut in smooth slices, and common carving, where the fat and lean are combined. The knife should be passed round the bone in cutting a joint, and great attention should be paid in helping every person to a portion of the best part. The outside piece should be first taken off, in such pieces as have an outside. The question should then be asked which is preferred. Always cut the slices rather thin with a portion of fat with each slice. If there is dressing or stuffing, observe to lay a portion with the meat on each plate. A sirloin may be cut at the end or into the middle. The joints in a loin of mutton or veal, should be divided by the butcher, and then they will be easily carved, and fine slices taken off between the bones. If there are different kinds of meat in piece, ask which will be preferred.

In carving large fowls, place the fork in the breast firmly, and carve first from one side of the breast, taking off the wing and leg, then on the other side, in the same manner, leaving the carcase containing the dressing; ask which part is preferred. Pigeons should be cut in halves either lengthwise or across,and half helped to each person. The skewers should be taken out before the dishes are placed on the table.

To carve a pig. This is generally divided by the cook before it is sent up. First divide the shoulder from the body on one side, and then the leg. The ribs are next to be separated in two or three parts. In serving, some like the ear and jaw, a bit of either with the stuffing should be served with some of the best parts of the pig on each plate

RABBITS. These are carved by separating the legs and shoulders from the body; the back is divided in two or three parts, cutting through the body; the head may be given to any one who prefers it; the ears being removed before it is served up.

A SADDLE OF MUTTON OR VENISON. Commence near the end and carve out lengthwise, pieces from the sides of the back bone, a portion of fat to each slice; they should be cut thin and smooth.

HAM should be carved about one-third from the thinnest end, cutting long thin slices.

SPARE RIB should be cut first from the thick meat, near the back bone, slicing it from the outside. If any prefer the rib bone, they are easily cut through and jointed after the meat is first cut off at the back.

A BOILED TONGUE should be carved through the thickest part, or nearly through the middle; slices from this part are more juicy and tender than from the end. This to accompany any of the white meats, is very nice and should be served to any who take chicken, veal or turkey.

HALF A CALF'S HEAD boiled is a genteel dish, if a small one, and well dressed. When first cut, it should be along the cheek bone in the fleshy part, where many handsome slices may be cut. The throat sweetbread lies at the end of the jaw bone; this may be cut in slices, and the eye cut from the socket, and if two are to be obliged, divide it, as some are very fond of the eye, also the palate, There is some gristly fat to be pared off about the ear, and also some good meat to be met with on the under side covering the under jaw.

A COD'S HEAD AND SHOULDERS, if large and in season, is a very genteel and handsome dish if well boiled. When cut it should be done with a spoon or fish trowel. All the parts are served except the green jelly of the eye, this is never given to any one. The palate, the tongue, the sound, and jelly about the head, are considered very delicate and nice, and should be served with a piece of the fish on each plate.

## SERVING TEA.

When the tea is to be sent around, let every thing be well arranged and in perfect readiness. There should be two

at least, whose services will be actively required in carrying the waiters. While the tea is pouring, the youngest should take the tea-plates on a small salver, and pass them, beginning at the ladies, and helping them first; then the gentlemen. As soon as this done, the tea should be brought The tea-tray should be large, and if coffee is served, place a cup of tea between every two of coffee the first time round as there is generally more coffee taken than tea. One should follow with the cream and sugar, the handles of the sugar-tongs and cream-spoon towards the company. When you first enter the room, cast an eye around the room and observe where the most of the elderly ladies are seated, and proceed forward, and help one of THEM first; lower the waiter that it may be easy to take the tea. Have in another tray, your biscuit spread, wafers, toast, cake, tongue, beef, or whatever is prepared to send, all neatly arranged, to take round as soon as you have served the tea; and if the party is large, this tray should be carried by ANOTHER, while you are serving the tea. When the ladies are all served, then proceed to help the gentlemen, beginning as with the ladies. When all the company are served with the first round, carry out your tray, and wipe it clean if wet; then take another waiter to receive the cups as soon as needed. During this interval, hand round your cake, &c. When you have received all your empty cups, rinse them, and proceed to serve round another course, beginning at the same lady, and going all round, leaving the lady of the family until the last, as strangers must be served first. This second round is generally enough; but hand round the cake, &c. once or twice after, then carry all out of the room; and if cold weather, see that all the fires burn well

### A FEW OBSERVATIONS TO COOKS.

Let your character be remarkable for industry and moderation; your manners and deportment for modesty and humility. Let your dress be distinguished for neatness, avoiding every thing that looks like finery.

Never think any part of your business too trifling to be well done. Eagerly embrace every opportunity of learning any thing which may be beneficial to yourself, or that may benefit others

Do not throw yourself out of employment for a slight offence, you may repent of it when it is too late. Come when you are called, and do whatever is required cheerfully. Do every thing at its proper time. Keep every thing in its proper place. Use every thing for its proper purpose.

Saucy answers are highly aggravating, and serve no good purpose. Muttering on leaving the room, or slamming the door after you, is as bad as an impertinent reply. It often leads to unhappy consequences; at any rate, you lose the esteem of those who WOULD be your BEST FRIENDS. The indulgence of a bad temper will seriously injure the reputation of those even who are most skilled in your art. "Temper is every thing;" this must be carefully cultivated by those who would be useful, or desire to please.

Apply to your employers and ascertain how they like their victuals dressed, whether much or little done. What complexions they wish their roasts, whether light or well browned, or if they like them frothed. How they like their soups, and sauces, and what accompaniments they prefer. What flavors they fancy, especially of spices and herbs.

Enter into all their plans of economy, and endeavor to make the most of every thing, as well for your own honor, as well as the profit of your employer. Take care that the meat which is to appear again on the table is handsomely cut with a sharp knife, and put on a clean dish. Take care of the gravy left, it will make sauce for other dishes. Many things may be re-dressed to advantage. The best way to warm cold meat, is to sprinkle a little salt over it, and let it warm gradually in an oven. Watch it carefully, and turn it often, for about an hour. Serve it up with gravy, as if freshly cooked. It is better than hashing it, and if done nicely, the cook will get great credit. Take care of the gravy you have boiled poultry and meat in. You may convert it into the best of soups with the usual seasonings, and make an excellent dish with little expense or trouble. Your soups should be otherwise made of the trimmings of meat, and the bones where the meat has been cut off for other purposes, seasoned with carrots, onions, and herbs, will invariably furnish a rich and palatable dish. To excite the good opinion of the eye is the first step towards awaking a good appetite. Each dish

must be well cooked, and sent to the table with its proper accompaniment in the neatest and most elegant manner. Decoration is most rationally employed in making a plain nutritious dish inviting. Be careful that nothing is over nor under done. Have every thing convenient for use, that no time be wasted in looking for things. It is a good plan to keep your peppers, spice, cinnamon, &c., cloves ground, put up in bottles, labelled and corked, that you may have them always ready for immediate use. Have your salt, saleratus, browned coffee, starch, &c., in boxes with covers labelled, and placed where they can be used conveniently. Have your rice, coffee, pepper, &c., in bags, hanging in their places. Have a good supply of holders ready made on hand, but two is sufficient to have in use at once. Keep them in their place, that they may not be missing when wanted. Keep all your sauce-pans, kettles, pots, &c., clean, and ready for use. Be careful not to accumulate cold dishes, but have every thing used in its time. A hanging safe, in a cool, dry, airy situation, is a suitable place to keep meat and poultry. They are better to be kept awhile, though not to injure. A careful cook will not suffer any thing to be lost for the want of attention. The hams and beef will be packed away early, before they can be injured by insects; the pork will be kept under the brine; the cheese protected from whatever may injure it; and every thing will have its appropriate care, and done in its proper time, thus securing a good reputation and making your services valuable. If you expect favor, you must make an effort to DESERVE it. Be fond of obliging, and grateful when obliged. Rather do more than is required of you, than LESS than your duty. Endeavor to promote the comfort and happiness of each member of the family, and at all times be cheerful, patient, and conscientious.

### TREATMENT OF DOMESTICS.

She that looks well to the "ways of her household" will consider with kindness each member that constitutes her family. If she has a woman's heart, she will often feel that those whose services she needs, and whose duties are of a toilsome nature, have a claim upon her care and sympathy, and will endeavor to lighten the burden and encour

age the hearts of those whose little stock of happiness is so much at her disposal. The kind manner, the approving word, the grateful smile, care for the health and habits that she manifests, soothes the perturbed spirit, and has a cheering influence leaving a brighter spot glowing in the bosom. Instruction in what belongs to the duties of their sex, as moral beings, as candidates for immortality, will secure the respect and affection, and promote the happiness and well-being of those whose highest aim, and perhaps pleasure, is to make you happy, and gain your approbation.

Justice in discharging the SMALLEST obligation is highly important. The wages should be promptly paid, and if you discover an effort to please, and regard to your interest, let it not be forgotten, but show your approbation, and encourage to a continuation of such a desirable course, by occasionally rewarding it with some trifle, which is a KIND OF TESTIMONY that will be valued and appreciated. An American female writer has observed that "SCOLDING has long been considered as UNGENTEEL, and that finding fault in a severe and pettish tone never does any good, that it is the last way to make one sorry for omission or faults." Give reproof in a calm undisturbed manner by first making inquiry, that there may be room for explanation. This is the best discipline to your own feelings, and may save you inflicting wounds that cannot be healed. Better dismiss from your family one that WILL NOT CONFORM to its rules, than to have its peace destroyed by unpleasant occurrences.

## GARDEN SHRUBS, ETC.. FLOWERS.

Let every home if possible be accompanied with the pleasures, the business of a well "kept" garden. It greatly enhances the delights that cluster there, by furnishing its rich and varied sources for enjoyment. The climbing vine, the swelling bud, the opening blossom, the glowing beauties of Nature's coloring, cannot fail to remind us of the goodness of their Author, and to stir the heart with the most pleasing sensations. How the purple plum, the delicious grape, the fragrant strawberry, and all the tempting fruits and delicacies, that hang on every stem, mirror to our hearts a picture of Paradise, and make us feel how sad a curse to be driven

at once both from the smiles of the Creator, and from the delights of the earthly Paradise, the garden of Eden. Cultivate flowers; it is a healthy employment, and exhibits evidence of refinement and taste. If you inhabit a cottage, the vines twined at the windows, and the sweet-brier by the door, the lilacs down the walk, and the snow-ball here and there, will make that cottage-home a place of enchantment. It is flowers that give, even to the log cabin, the appearance of happiness and peace. They draw out our hearts in admiration like the virtues, when connected with deformity, and we cannot avoid yielding the homage of our love.

### PRACTICAL HINTS.

Shrubs require an annual pruning, to remove the superfluous branches, and to form a handsome bush. Apply props to such as need support. Some shrubs may be raised from seed sown in early spring, but are most commonly obtained, from layers, suckers, and cuttings, buds or scions. They require a good soil, and those most tender, need protection in winter by a covering of straw, leaves, or litter. To obtain shrubs from slips, it must be done before the buds begin to swell, or before they leaf. They should be taken from the parent stem so as to leave an eye or bud at the lower end, and that part should be well covered with earth, and the ground kept moist.

### CUTTINGS OR SLIPS.

They should be of the last year's growth, the joints near together, and should be three or four in a cutting. They should be planted from four to six inches from the end of the stem. They should be sheltered, and the ground enriched and loosened. Press the earth around the stem, and insert them about one-third their length. Water them in dry weather, and by autumn they will be rooted.

### SUCKERS.

These are young plants that shoot up around a shrub or tree from the root; they may be carefully separated in spring or autumn, and transplanted.

### LOCUSTS.

Sow the seed in March, April, or May, in good sandy loam, half an inch deep. Pour scalding hot water on

the seed, and let it stand all night. Pick out such seeds as have swelled, and plant them. Repeat the process with those that did not swell, and sow them, and they will come up the next month abundantly. The next year transplant them into rich sandy ground. They sucker freely, and may be propagated rapidly by transplanting them. Let none be lost.

### SHRUBS.

There are several varieties of lilacs. And they might be found more abundant than they are. It is not understood how easily with proper knowledge and suitable care every dwelling might be furnished with all the common varieties of flowering shrubs. By slips or suckers, the lilac, snowberry, syringa, guilder rose or snowball, laburnum, and others, with their beauty and fragrance, might be made to contribute to our enjoyment, and adorn every "home" in our land.

### DAHLIAS.

This splendid plant is raised better from the root than from seed. As soon as they have done flowering, the tops should be cut down and the root well covered with litter and earth, to ripen without being injured by frost. In about a week or on appearance of severe weather, they should be dug up and put in dry sand out of the reach of frost. They should neither be kept too damp or dried to a husk. If kept well, they will begin to sprout around the old stem and tubers, in March or April. They should then be put in light earth, or in pots, and kept in a warm room and watered. As soon as they have grown two or three inches, they may be divided in such a manner as that each sprout should have a piece of the tuber strongly attached. Each of these will make a plant, and must be kept growing in separate pots until about the middle of May. Then they may be set out in beds well prepared with compost, and made mellow with the earth they are in around them When set out, place a neat stake near, that the brittle stem as it grows may be fastened at every joint with twine, as the wind and rain will destroy them. If raised from seed, sow it the last of February or first of March in pots. The earth should be a mixture of sand, leaf mould, and compost, or that which is equivalent.

### CALLAS OR ETHIOPIAN LILLY.

This elegant plant needs moist ground, but should not be watered much while in bud or blossom. It should have plenty of air and light, but too much heat causes it to turn yellow, and its rich leaves to die and fall. This plant i best propagated by suckers, which spring up around th parent stalk.

### GERANIUMS.

These are propagated easily by slips, placed in pots, and kept from the sun with the ground kept moist. They should not be wet when in full bloom, but it may be done before the buds are expanded.

### MONTHLY ROSES.

These need sun and air, when they are rooted and should be watered in proportion as they receive it. The young wood furnishes buds and blossoms.

### THE PASSION FLOWER.

This is a beautiful vine and requires to be well trained and supported. They will grow to cover a large surface if properly attended. They must have the climate of a warm room or Green House.

### THE HONEY SUCKLE.

This in its varieties is a desirable vine for the frame work at the door, the piazza, &c. It may be increased by turning the ends downward into the ground. It should be carefully trained.

### GARDEN ROSES.

These should be pruned after they have done flowering Cut out the old wood where it is too thick, shorten such shoots as have a good eye or bud, and a healthy leaf, and all that grows after this pruning will produce large flowers the next year.

In November cover flowerbeds with leaves, straw and litter, also the roots of grape vines, and other tender plants and shrubs.

If plants are watered too much, they will perish of mildew Slips should be exposed gradually to the sun. A

piece of the older wood on a cutting, causes it to strike root more readily. To avoid the bad effects of evaporation, the leaves are often removed from the lower part of the cutting of shrubs and trees, they are more likely to live and thrive, Take them from branches that grow near the ground.

Transplantation is best done in the spring or fall, but may take place at all seasons, if the newly formed extremities of the root are uninjured.

All garden soil should be dug and made mellow. If insects prevail on plants, they should be fumigated with tobacco, or watered where tobacco leaves have been soaked. April is the time to clip the edgings of box, and remove the roots that are superfluous, in a border or on beds. There may be from your yard enough spared, to adorn that of a friend. See to it that nothing of the kind is lost. Trim the cuttings of trees or shrubs a little, that the leaves or branches do not touch the ground, it will cause decay. Both ends of a tubular stalk may be inserted in the earth, and it will produce two plants and be most likely to live. Never water the top or leaves of a plant when the sun shines, it should be confined to the root. The watering of plants is best done morning and evening, except when newly transplanted or when shaded from the sun. In September, prepare beds for planting tulips, hyacinths, anemones, ranunculusses and other flower roots aud shrubs that are to be planted the next month. When necessary trim pines, firs, walnut trees and maples, as the sap will not so much exude as in spring, also, plant beds of strawberries.

TO OBTAIN DIFFERENT FLOWERS FROM THE SAME STEM.

Split a small twig of elderbush lengthwise, and having scooped out the pith, fill each compartment with flower seeds of different sorts but which blossom about the same time surround them with mould, and then tying togetner the two halves, plant the whole in earth. The stems will exhibit to the eye flowers of the different varieties of seed, as from one stem.

## FRUIT TREES.

We hear complaints of the decay and death of fruit trees, but it is through neglect, or a want of knowlege of their diseases.

### SOAP FOR KILLING BORERS IN TREES.

Hard soap rubbed carefully into every place in the tree, which seems to be wounded by them, will destroy effectually these nuisances to gardens and orchards. The rain will dissolve it, and force them out of their holes and cause their death. Strong ley put on with a swab or brush, is equally good; made of potash, one pound to a gallon of water.

### APPLE.

Pruning the decayed limbs, and rubbing the trunks with a hard brush, and painting with a mixture of soft soap and flour of sulphur, in proportion of five gallons of the former to one of the latter; and also strewing lime under the trees and around the trunks, will prevent decay—revive and almost resusciate the dying. It improves the quality of the fruit, and the grass, and helps to destroy the worms.

### PEACH.

These trees do best in elevated situations; when the soil is unfavorable on hills, it should be improved; cold, wet, or spongy soil is unfavorable. When peach trees begin to languish, remove the soil around them, and supply its place with charcoal, it will produce a sudden renovation and improve the richness of the fruit. Prune in the extremities of the branches of bearing trees, two feet in July every year. This will keep the tree full of bearing buds and healthy wood. All trees that have the yellows must be removed, as the disease is contagious. Graft them in September. Peach trees may be preserved from the ravages of the worms, by freeing the diseased part from earth, and gum, and spreading over it a thin coat of common hard soap, and filling up with fresh soil. It not only destroys the insect, but preserves the tree in a healthy state; even if used freely, it will not injure it. Soft soap is equally good applied in the early part of April, and then again in the early part of June. It must be repeated every season, and as it is dissolved by the rain, it descends to the roots, and causes it to grow vigorously, besides destroying insects and eggs, and cleansing the bark. Several hundred trees may be done in a few hours. It is equally good for other fruit.

### QUINCE.

This is a beautiful tree when in blossom, and when the fruit is ripe, it is highly ornamental. It is easily raised from cuttings or layers taken from the tree in April, and planted in a shady place, and the soil enriched, which will keep it from sudden drought. Also water occasionally They might grow in any part of the country with suitable care

### PEAR.

This tree dies of a disease called the fire blight. It occurs in summer; the leaves from the extremities of the branches, for two or more feet, appear as if scorched. This should be cut off a foot or more from the diseased part, and immediately buried. When this is practised, the evil is arrested.

### PLUM.

This tree is becoming deplorably affected with the "black gum" caused by an insect. That part, where this disease is found, should be cut off and burned, without delay. This will preserve it.

### GOOSEBERRY.

The bush should not stand against a fence; it should be well trimmed every spring, especially in the middle of the bush; never allow two branches to rub against each other. Dig well around it, and enrich the soil at the time of pruning. Sprinkle them with soap suds from the washtub three or four weeks before blossoming out; it will prevent mildew, and produce fine large berries.

### RASPBERRY.

Set them in cool deep moist soil, in a sheltered and partly shaded place, and they will throw up suckers to the height of six or eight feet, and produce large and well flavored berries. They are easily cultivated, and rapidly propagated by cuttings, suckers, and layers · No one who has enjoyed the luxury of the white raspberry in its season, will be willing to do without them.

### CURRANT.

Keep the bushes well trimmed, and the fruit will be much larger and better flavored.

### STRAWBERRY.

Plant them about two feet apart each way, and cut off the runners, that you may have larger and better fruit, as the sun and air will then more easily circulate through them. Water them around the root, as it spoils the flavor of the fruit to be over-watered. Charcoal dust, and soot, greatly improves the soil of strawberry beds; the soot should be sprinkled, and hoed in during the month of April; and the charcoal after rains, when the ground has become hard.

### CELERY.

Set out the plants in rich compost and earth six inches apart, as they progress in growth, draw the earth around them, but not to touch the central part; water with salt and water, or scatter salt around the plant, and it will be greatly improved. It is a saline plant, and is found in some countries in ditches near the sea. It may be kept in the cellar or green-house through the winter, for use.

### ASPARAGUS.

In spring, the soil should be always enriched if not done n the fall, which is preferable. As soon as the frost is out of the ground, the earth should be chopped two or three inches over the beds, and the compost hoed in. Then the soil should be stirred every day or two, to keep out weeds, until the plant comes up. When you cut the tops, take them off even with the surface. This plant also is saline, and is benefitted with waterings of salt and water.

### EGG PLANT.

The fruit of this plant is highly esteemed by many. The seed should be sown early, and transplanted into the open ground in early June, two feet apart; care should be taken to protect the young plants from the black flea.

### CRESS OR PEPPER GRASS.

Is a beautiful salad, alone or with lettuce. Sow in drills, nd cut before it comes into rough leaf.

### RHUBARB.

A few stems cut from the roots, and planted in rich ground our feet apart, will furnish stems enough for a family. No

garden should be without it, as the stalk is a luxury, made into a pie. The leaves are poison.

### CUCUMBER.

An improved mode of cultivating this favorite plant, is in digging a hole in the earth, and filling it with about a peck of leeched ashes, and covering the ashes with a small quantity of earth; then planting the seed on a level with the surface of the ground. This has been tried with great success.

### TOMATO.

It is a good plan to sow the seed in a hot-bed, or in boxes, in April, and transplant them when danger from frost is passed. They should be four feet apart in good rich ground, and the vines supported by a frame-work of some kind, or brush, as the fruit will be better than if left on the ground. The cherry or plum tomato for pickling, and the large red, are best for preserving. Though both are used for a vegetable.

### BROCCALI AND CAULIFLOWER.

This plant should be cultivated like the common species of cabbage. It is much nicer grown in rich soil, and the ground kept loose about the root.

### VEGETABLE OYSTER.

There is no vegetable that the lover of the real oyster would value more than this easily cultivated plant. When once in a garden, they are not soon destroyed. They should have good soil, and be cultivated like other spindle shaped roots.

### NASTURCION.

This beautiful plant is valued for its cress-like pod, used as a pickle. They need the support of a frame-work or bush to keep them from the ground.

### LETTUCE.

If you wish to have early salad of this plant, start it in a hot-bed or boxes, and transplant into your garden, setting them far enough apart to keep the earth loose about the root, and they will head tender and larger.

# CANARY BIRDS.

## THEIR CHARACTERISTICS, DIRECTIONS FOR REARING, FEEDING, AND NURSING THEM.

Canaries are not naturally so delicate as they are thought to be, but become so for want of proper care They excel most other birds in their good qualities, the sweetness of their song, which continues most of the year, except the time of moulting, when they are generally silent, though some in spite of this annual illness do not even then lose their song. Their plumage is delicate and sometimes beautiful, which is displayed in different colors, most commonly in a bright yellow or straw color. They are very docile and will learn a variety of pleasing little tricks, such as coming at the call and pronouncing words distinctly. They will also learn airs and keep time like a musician. As to the time of pairing, it generally commences about the middle or latter end of March. or perhaps a better criterion would be when the frosts disappear, and the sun sheds an enlivening warmth. Put the pair you intend to match into a small cage, and although they may at first be quarrelsome, they will soon become reconciled. which will be known by their feeding each other, billing, &c. Feed them at the time with the following. Boil an egg very hard, chop and grate it fine add bread crumbled equally fine, a little maw seed, mix this well, and give them a tablespoonful twice a day. In ten days they will be paired. Place the cage in a room that enjoys the morning sun, and not where it shines hot in the afternoon, as the excessive heat will produce sickness, breed mites, &c Place in the cage a little hay and cows hair, the latter after serving once, may be washed and dried for future use in building nests. The nest boxes are composed of wicker, or wire bottoms, so that the dust falls through, and there should be but one in a cage at a time or until the hen has hatched, then put in another and make the nest for them. as it saves them much fatigue; if it does not please them they will alter or adapt it to their fancy. The following food must be given

when they have young: Boil an egg and grate it—take as much bread as the size of an egg and grate and mix well together, and feed them a spoonful three times a day. For a change soak a piece of stale sweet-bread in water—squeeze it out and add a little sweet milk and feed them —also give them a little cabbage in its season. This and chickweed, and salad, may be given in their season three times a day. But if they are given early in the year before the bitterness has passed away they are hurtful. The hen sits thirteen but more generally fourteen days. Clean the perches, fill one fountain with water and the other with seed, so that they shall not be disturbed for two or three days after they hatch. When your young ones can feed themselves, you may cage them off, and give them egg and bread as before stated, with a little maw seed, with some ground or bruised rape, till they are seven weeks old; when they will be able to crack hard seed, which should be given them before that time. If you wish to make one very tame you can bring it up by hand, taking it from the old ones as soon as they are fledged, or feathered, which will be in eleven or twelve days. When taken from the hen, it should be placed in a warm box, and placed in rather a dark situation, to make it forget the old ones.

Sometimes you will be obliged to remove them. If the hen should be ill, they should be taken from her, for she cannot feed them; and when she leaves them to the care of the male bird or if she plucks the feathers from her young, they should be removed, as in that case she will kill them in two or three days.

The following paste may be given, which will keep good fifteen days. Bruise in a mortar or on a table with a rolling pin a quart of rape seed in such a manner that you can blow the chaff away, and a piece of bread, reducing them to powder. Put it in a dry box and keep it from the sun. Give a teaspoonful of this, and a little hard egg grated with a few drops of water. This will become unfit for them after twenty days, as then it will be sour. It may be given without harm to the old birds if necessary, but it must be given dry. Or if preferred, you may

give for the first three days, grated egg and sponge biscuit made fine and mixed with a little water to make it like paste. Then add a small quantity of scalded rape seed, as then they are strong enough to digest it. They may also have a small quantity of chickweed seed, and a sweet almond peeled and chopped fine. The chickweed may be given twice a day in very hot weather.

Birds brought up by hand require to be fed once in two hours. To feed them, sharpen a little stick of wood and give them at each feeding four or five mouthfuls, or until they refuse to open their mouths voluntarily. At a month old you may cease feeding them with a stick, as they will then begin to feed alone. You must put them in a cage without perches first, and have a little bird seed in a box or glass, and in about seven weeks take the soft food by degrees away, and leave only the hard seed. It will be well occasionally to give a little bruised hempseed, especially in winter. If they are ill when young, treat them as follows. Bruise some hempseed and soak it a little in water, then squeeze it through a cloth which forms what is called the milk of hempseed. This will strengthen and nourish young birds very much, but you must take the water glass away when you give this medicine.

### DISEASES TO WHICH THEY ARE SUBJECT.

Outward signs are absolutely necessary to judge of their diseases, and when ill they exhibit strong symptoms.—The first spoken of, is the swelling of the stomach, which attacks them at a month or six weeks old, in consequence of over feeding on soft food such as salad and chickweed. The extremity of the body becomes swollen, of a dark red colour, and very hard, full of small red veins and the bowels seem to protrude. For this, put in a small piece of alum in the water and renew it every day, for three or four days at least. This will frequently be found to answer. Another remedy is to put a rusty nail into the water, which should be changed twice a week leaving the nail in it. Boiled bread and milk with canary seed boiled in it, is sometimes effectual. Put it inside the cage for five or six mornings and at twelve o'clock you

may give the usual food. Another remedy is, to put the bird in lukewarm milk for six or eight minutes, that a portion of it may be absorbed by the pores, then put him in warm spring water, after which wipe him with a soft muslin before the fire until dry. Then put him in his cage and place it before the fire a short distance or in the hot sun in the room. After putting him in his place give him lettuce seed and let him rest the next day; repeat this on the third day, and if necessary three or four times with the interval of a day each time—as much for the repose of the bird as for the remedy to operate. This gives relief if faithfully applied.

The moult or renewal of the feathers, is also a dangerous time, it occasions sometimes death. Very few die if the autumn is fine, and temperate. It generally attacks young birds when about six weeks old, and lasts two months. They appear melancholy and often sleep in the day with their head under their wing. The cage will be full of small feathers, as young birds do not cast the wing or tail feathers the first year, but the second they moult throughout. At this time they eat but little and only such as they like best, they require a variety of nourishing food and require to be kept warm. The least cold at this time will prove fatal. If they are bad you may give them a piece of sponge cake or biscuit soaked in white wine; sherry is best, if they eat this it will do them much good, and it is good to sprinkle a little over them and place them before the fire. A little refined liquorice in the water is good. A few grits make them cast their feathers while moulting. If they should have a small pimple on the extremity of the body and appear rather dull, cut off the top of it with a pair of scissors and put on a little salt and sugar, and if the pimple is not well formed put on sweet oil.

They sometimes have red mites if the cage is not kept clean. It may be discovered by their frequent plucking and feathering themselves. But it may be avoided by cleaning the cage twice a week.

Canaries are subject to other diseases, which may be cured without much trouble. If they are attacked with

diarrhea, pull a few feathers out of the tail, and rub on the oil of sweet almonds on the lower part of the body. Give them hard yolk of egg, grated sponge cake, scalded lettuce, and melon seed, for food.

If they throw their seed about the cage without eating it is an indication that they need purging. Give them rape seed with a lettuce leaf or a little chickweed seed which will soon relieve.

When paired, the hen is sometimes "eggbound," and falls off the perch on her back, and if not helped dies. For this take her out of the cage and rub on the oil of sweet almonds gently on the lower part of the body which enables them to discharge the egg. A piece of mortar laid in the cage will also relieve. This should be kept in, to prevent this difficulty.

If they break a leg take out the perches and put soft hay at the bottom of the cage, also their food. Their cage should be covered that they may not be disturbed.

Birds in moulting sometimes lose their song; good and nourishing food will restore; put liquorice in the water.

If a bird should have a swelling on the beak or foot wash it with sweet oil or milk—taking care to keep the cage very clean, that no dirt or dust adhere to the sore.

## GENERAL DIRECTIONS.

To keep canaries healthy, the cage should be washed as often as once in two weeks and often cleaned. Fresh lettuce or cabbage may be given them in July and August, plantain is also good, it may be given in hot weather three times a day. Lettuce seed and plantain seed is also good to be given as food, mixed in a small pot. In hot weather they should have clean water in pans once a day to wash and bathe in, which greatly refreshes them. A piece of cuttlefish bone or sand, should be in the cage to keep them in a healthy condition. Their fountains should be filled, and the water fountains changed every day. The bird seed is a mixture already prepared, to be used as it is. Sponge cake may be given occasionally, but food containing salt is injurious; crackers and sweet apples, worms, are also good.

To distinguish the male from female, it is observed that a streak of bright yellow may be noticed over the eyes and under the throat, his head is wider and longer and in general is much higher colored, his feet too are larger. They also begin to warble first, which is often at a month old. They are quicker, more taper and sprightlier than the hens. If the hen lays, take out the egg and substi tute an ivory or wooden one, as they then will hatch all at the same time. If the hen does not lay before eight o'clock in the morning, she is ill and needs remedies spoken of before.

Canaries may be taught to sing entire tunes by means of a flageolet or bird organ, in the following manner. In ten or twelve days, when he begins to feed himself, take him away from all the other birds, or sooner if he begins to sing. Let his cage be covered with a thin linen cloth eight days; then take the instrument and play one tune five or six times a day for fifteen days, then remove the linen cloth and substitute a green or red one of a thick material. He must remain covered in this way until he is perfect in the air you wish him to learn. During this time it is best to put in his seed at night, that his attention be not divided. The organ should be sweet toned, as they copy with great exactness. Some learn in two, and others in six months. This makes a bird a great favorite and of course valuable.

### TREATMENT OF THE MOCKING BIRD.

This is one of the sweetest songsters in the Universe; he can imitate the whole grove of melody, and of himself can make a concert; his imitative powers display the Creator's wisdom and goodness in a greater measure than any other bird. He can be made so docile as to perch and sing upon the hand, he never tires in his sweet employment; night and day he warbles incessantly so that the American Nightingale (as he is sometimes called) is like that of which Cowper says,

> "Ten thousand warblers cheer the day
> And one the live-long night."

The treatment of the Mocking Bird is not very pecu

liar or troublesome, only requiring to be fed every morning with indian meal wet with milk not very stiff. Whortleberries, Cedar, Elder and Pokeberries may be given to them freely, also wild cherries in the month of October and November may be used. It is a good plan to dry them for winter use; these birds thrive best with a great deal of natural food. An egg boiled hard and grated is good, also a small piece of raw minced beef to be given occasionally. During the summer, air is beneficial, but not the sun. A little water, in a cup for washing once a week, is of service, but the greatest care is required when moulting, which is from August till November. He should be kept from cold draughts of air and well supplied with berries, spiders and grasshoppers, as they live in their native woods mostly on insects. They should be fed and watered regularly every morning by eight o'clock. When this bird becomes sickly treat him very kindly, give him spiders daily, also meal worms, which may be found in granaries. Put gravel on the bottom of the cage, and keep them quiet.

The male is known from the female by a regular line of white feathers in the wing, which in a fine bird forms almost a curve from the shoulder to the tip of the wing. They are after all difficult to distinguish, as some of the finest birds when young are found to have been irregularly marked. They are not completely plumed until they are two years old. They sing from January until the last of August.

### AMERICAN YELLOW BIRD.

This bird is very common in the middle states, and partakes much of the nature of the Canary. They are of a clear yellow, dark wings with a dark spot on the head: they are admired both for their plumage and their song. If placed near a Canary they will acquire many of their notes. It should be an old established singing Canary otherwise they will take the Yellow-bird's song to the detriment of his own. They should be fed with yellow and hempseed; two thirds of the former. A leaf of lettuce, cabbage, or a piece of apple is of service. Strew a little brown gravel on the [illegible] cage

### CAROLINA RED BIRD.

This bird is indigenous to the Southern States, and is seldom seen north of Virginia. They are greatly admired for their brilliant plumage, being a fine scarlet with a beautiful topped head: Their notes are free, but not particularly sweet. Being a southern bird they delight in a warm temperature, of which care must be taken in winter. Their natural food is rice. The rough or unhulled rice mixed with hemp seed, which may be found already mixed, should be kept for them. A small quantity of cracked corn is of service. The same directions apply to the Java Sparrow.

### THE AMERICAN ROBIN.

This bird is not the robin redbreast of Europe, ours is a much larger bird. Their plumage (the male) is a rich hazel colour, with clear white stripes under the throat: the back is of a dark brown, eyes very sharp, of a dark hazel with a delicate outward ring, their carriage is erect and bold, which is pleasing, they can be tamed to come out of their cage at the call of a name, they can be taught to imitate a flute with surprising accuracy. It is related of one that he whistled a tune so correctly that it might have been mistaken for a flute or flageolet. There has been one kept by a gentleman that played on band instruments, and the bird caught the marches, to the astonishment of every one that heard it. They are treated like the Mocking bird.

### HOW TO TAKE CARE OF RABBITS.

There are several varieties, but the broad chested and short legged are the best. Rabbits require much the same food as sheep and generally the treatment so far as food is concerned. They should be fed three times a day with dry substantial food. The grain best for them is oats, peas, wheat, pollard or shorts, and some use buckwheat. The greens and roots the same as for cattle and sheep—carrots, Jerusalem artichokes, boiled potatoes, lucerne, clover, cabbage leaves, tares, etc. The best dried herbage is clover, hay, and pea and bean straw.

The utensils used for feeding them should be made of

something they cannot destroy, as they are apt to gnaw all wood. They will rear five or six litters in a season, and increase rapidly, as they produce five or six at a time. A warren should be provided for their use with artificial mounds of sand where they can provide themselves sleeping places, &c.

Rabbits are eagerly sought in market. Some of the larger kinds if cooked in the same way are equal in flavour to a turkey, and are highly prized. Rabbits are in perfection at the fourth or sixth month, then they become more dry in flesh and somewhat hard. Three months is the time allowed to make a rabbit fat and ripe. For the table or the invalid their flesh is equal to poultry. If they are ever diseased, it is in consequence of too much green food, and may be remedied by using grain and dry food.

### THE MANAGEMENT OF HENS.

Their habitation in winter should be warm, and if convenient made to come to the ground and supplied with old plastering, ashes, pulverized oyster shells, charcoal, fresh water once or twice a week. Beef's liver or some other kind of meat, baked or boiled potatoes warm, fragments of cooked vegetables, and keeping corn always by them, is the best manner of feeding them, and they thus are always sufficiently fat for the table. It is a good plan to soak their corn, and when they have it always in their trough they take but a few kernels at a time, but when irregularly fed they will eat too much and stop laying, and not unfrequently become diseased.

Hen houses should be kept clean, their roosts also. Broken or bad eggs should not be allowed to remain in the nests, and it is well to have lime or ashes at the bottom under the hay. Dirty water should not be given—their food should be fresh and free from fermentation, and in this way from a flock of a dozen hens a family may have plenty of fresh eggs during the year.

To prevent lice, a mixture of sulphur in their food once a fortnight should be given, and it is also a remedy—it may be given in small quantities to young chickens for the same purpose.

## CHOICE RECEIPTS FOR DYEING.

### GENERAL RULES.

The materials should be clean, rinsed from soap, and entirely wet, that they may not spot. Light colors should be steeped in brass, tin, or earthen, and if set at all, with alum. Dark colors should be steeped in iron and set with copperas.

### FOR SKY BLUE.

Get the blue composition.—It may be found at the Druggists or Clothiers for a shilling an ounce. If the articles are not white, the old colors should be all dis charged by soap or a strong tartaric acid water, then rinse. Twelve or sixteen drops of the composition stirred into a quart bowl of soft warm water and strained if settlings are seen, will dye a great many articles. If you want a deeper color, add a few drops more of the composition. If you wish to color cotton goods, put in pounded chalk to destroy the acid, which is very destructive to all cotton. Let it stand until the effervescence subsides,and then it may be safely used for cotton as well as silk.

### FOR LILAC.

Take a little pinch of Archil and put some boiling hot water upon it, add to it a very little lump of pearlash. Shades may be altered by pearlash, common salt, or wine.

### A PURPLE SLATE.

One paper of ink powder, one quart of vinegar, sufficient water to wet the articles well. Done in brass.

### NANKIN COLOR.

A pail full of lye with a piece of copperas half as big as a hen's egg boiled in it, will produce a nankin color that will not fade.

### A COMMON SLATE.

Tea grounds boiled in iron and set with copperas, will make a good slate. Also birch bark boiled in copper, brass, or tin, and set with copperas will produce a fine slate; set with alum a bright nankin color.

### LEMON COLOR.

Peach leaves, bark scraped from the barberry bush, saffron, etc., steeped in water and set with alum, will color a bright lemon, drop in a little gum Arabic to make the articles stiff.

### ROYAL PURPLE.

Soak logwood chips in soft water until the strength is out, then add alum, a teaspoonful to a quart of the liquor. If this is not bright enough, add more alum. Rinse and dry. When the dye is exhausted, it will color a fine lilac.

### CRIMSON PER POUND.

One ounce of cream tartar, two ounces of powdered alum, one ounce of cochineal, two drachms of powdered sal ammonia, quarter an ounce of pearlash, six ounces wheat bran. Take a brass or copper kettle with four gallons of rain water; when at scalding heat, add the cream tartar and alum. Let the liquor boil, then put in the cloth, stirring it frequently for an hour and a half. Take out the cloth, rinse it in cool water and air it. Empty the dye and put in as much clean soft water as before; when blood warm, add the bran tied in a bag, take off the scum as it rises, while the water heats moderately. Take out the bag, add one ounce of cochineal, boil it, put in the cloth, stir it for an hour, rinse in cold water. Empty the dye, and put in as much clear water as before; when as warm as the hand can bear, put in the sal ammonia, when dissolved put in the cloth, move it hastily for five minutes and then drain. Now add the pearlash and mix it. When almost scalding hot, put in the cloth and move it constantly for ten minutes. Take it out, air, and rinse it, and the color will be permanent and beautiful.

### GREEN PER POUND.

If you cannot get the blue composition, or prefer to prepare it, the following is a receipt for making it. Ingredients for the whole, one ounce and a half oil of vitriol, quarter ounce of indigo, one ounce of cream tartar, two ounces alum, eight ounces fustic. Prepare the compound in the following manner. Put the oil of vitriol in a glazed

earthen jar, and add the indigo pounded fine and sifted. Stir it hastily with a stick to produce general fermentation. When done add half a tablespoonful of water, stir it, and in one day it will be fit for use. If it does not ferment, it is not good. To dye, prepare a brass or copper kettle with three gallons of water per pound of woolen, add the cream tartar and alum when the water is scalding hot. Make it boil. When dissolved, put in the cloth and boil one hour and a half, stirring occasionally. Then take it out, drain and air it. Put in water enough to make up the deficiency caused by boiling, and add two thirds of the compound, mixing it well. Then put it in again, keeping the dye only at scalding heat, moving it often in the dye. After half an hour take it out, air, and rinse it. Put the fustic in a thin bag, boil it in the liquor an hour and a half. Take out the bag and put in the woolen, boil gently more than an hour, airing it once in the time. If you wish to make a different shade, after airing it, add a little more of the compound, or fustic, as the case may be. Air and rinse it.

### ORANGE PER POUND.

One ounce of annatto or otter, two ounces of pearlash. Cut the annatto and put it in a bag, soak it in two and a half gallons of water. Add to the above one ounce of pearlash and boil it one hour. Wet your woolen in hot water, drain it, and put it in the dye. Stir it one hour while it boils. Dry and then rinse.

### CINNAMON COLOR.

For twenty-four yards of woolen cloth, take three pounds of ground camwood, three pecks of butternut bark. Put your water in a brass or iron kettle, and let it boil a few minutes to extract the strength. Put in your cloth, stirring it often, and let it boil an hour or more. Then take it out and air it. Put it in the same length of time, and air it as before. If the color is not dark enough, dissolve a little copperas in hot water, and add to the dye. Boil the cloth a few minutes and rinse in cold water.

### SCARLET.

Dip the cloth in a solution of alkaline or metalic salt, then in a cochineal dye and let it remain sometime, and it will come out permanently colored. Another method. Half a pound of madder, half an ounce cream tartar, one ounce marine acid, to a pound of cloth. Put it all together and bring the dye to a scalding heat. Put in your materials and they will be colored in ten minutes. The dye must be only scalding hot. Rinse your goods in cold water as soon as they come from the dye.

### TO COLOR A BRIGHT MADDER.

For one pound of yarn or cloth, take three ounces of madder, three ounces of alum, one ounce of cream tartar. Prepare a brass kettle with two gallons of water, bring the liquor to a steady heat. Then add your alum and tartar and bring it to a boil. Put in your cloth and boil it two hours, take it out and rinse it in cold water. Empty your kettle and fill it with as much water as before, then add your madder, rub it in fine in the water before your cloth is in. When your dye is as warm as you can bear your hand in, then put in your cloth, and let it lie one hour, and keep a steady heat, keep it in motion constantly, then bring it to a boil fifteen minutes, then air and rinse it. If your goods are new, use four ounces of madder to a pound.

### DIFFERENT MODES OF DYING BLACK.

Rub a brass kettle with soft soap, turn it upside down in a warm place twenty-four hours, then fill with soft water, rubbing the verdigris from the kettle into the water. Put your logwood in a bag and soak in a warm place several hours. Put your cloth in wet, and boil gently two hours or more, airing constantly and stirring well. Wash thoroughly before dyeing.

### ANOTHER MODE.

Soak your logwood chips in warm soft water one day to extract the strength, take out the chips and put in your goods, and soak them until well saturated with dye, stirring and turning often through the day. Then take out your goods and air them. Put an ounce of copperas in

the dye, and when dissolved, dip your materials, raising and turning often a few minutes. Then take them out, air and dry. Then wash in suds and sweet milk thoroughly and rinse, and you will have a fine black.

ANOTHER.

Logwood and cider, or vinegar, in iron, makes a good black for woolens.

Black inkpowder boiled in vinegar and set with a small bit of copperas makes a good black.

## MAKING SOAP, &c.

Soap cannot be made unless the lye is of the right strength, it must not be too weak nor too strong. And it sometimes occurs that when the lye is of the right strength that it will not form soap, the reason is, that from exposure to atmospheric air it is deprived of a property essential to success. This may be remedied by lime. After boiling it with suitable proportions of grease and lye, and not being successful, put in a lump of lime, if not enough put in more and it will form soap, when every hope of success had fled.

Lye should be just strong enough to bear an egg, as large a spot as a shilling piece if it sinks below, or is borne up half way it, will not do. Use three pounds of grease to a pail full of lye, and when it boils thick, it is ready to put away. Potash will make soap if dissolved by boiling, but it is not as good as hard wood ashes, put up in barrels or leaches for lye. To make a barrel of soap it will require five or six bushels of ashes, with four quarts of stone lime, if slacked, double the quantity. The lime should not be put at the bottom of the leach, but dissolved in two or three pails of boiling water, and turned on the ashes, after it has run a pail full or two of strong lye.

The barrel should have holes bored in the bottom and raised with four bricks, or a barrel without a bottom will do, with sticks and straw to keep the ashes in place, standing on a wide board with a channel cut for the lye to run. Soak the ashes by putting up a little water at a

time a day or two, and then a gallon every hour or two, until the strength is exhausted.

### VALUABLE RECEIPT FOR COLD SOAP.

Cleanse your grease by putting in a little strong lye and boiling it thoroughly, then fill up with cold water, and the grease will float. Skim it off, and melt it, put it in your barrel and place it in the sun. Try the lye to have it the right strength, and heat it. Put in two pounds of grease to a pail full of lye and stir it every day. If it does not begin to look like soap in five or six days, add a little hot lye; if this does not help it, add grease. This mode some prefer. If made of potash, take twenty-five pounds of clean grease melted, eighteen pounds of potash, and dissolve in four pails of water, boil until dissolved, put the grease and two pails of hot lye in a barrel, the next day another, and the next day another. Then fill up the barrel with hot water, a pail each day, stirring it well, and it will be nice soap. The sediment of the potash bad.

### HARD SOAP.

Dissolve twenty-five pounds of white potash in three pails of water. Heat twenty pounds of strained grease and add the lye and boil together until thick. Take it from the fire, stand in cold water until it becomes thin. Then put to each pail of soap a pint of salt and stir it well. Let it cool, and when hard take it from the lye and heat it over a slow fire. If you wish it yellow color put in a little palm oil and turn it in wooden vessels. When cold separate it again from the lye, cut it in bars and let them stand in the sun several days to dry.

### ANOTHER MODE.

Take eight pounds of soft soap, if you wish it nice, use that made of olive oil, boil it two hours with six pounds of common salt and it will make five pounds of hard soap. Add a little rosin when you melt it over, and if you wish it nice, scent it with fragrant oil.

### WINDSOR AND CASTILE SOAP.

Slice the best white soap as thin as possible and melt it over a slow fire. Take it from the fire, and when luke-

warm add oil of carraway enough to scent it, or other fragrant oil. Turn into moulds and et it remain in a dry place five or six days.

Castile soap is made by boiling common soft soap in lamp oil three hours and a half.

### NICE SHAVING SOAP.

Take a quarter of a pound of Castile soap, one cake of old Windsor soap, a gill of lavender water, the same of Cologne water, and a little alcohol. Boil all these together until thoroughly mixed.

### BAYBERRY AND MYRTLE SOAP.

Dissolve two pounds and a quarter of white potash in five quarts of water. Mix, and boil over a slow fire, ten pounds of bayberry tallow or myrtle wax, till it turns soap. Then add a teacup of cold water and boil ten minutes, scent with any fragrant oil and turn in moulds to dry. Let it stand in the moulds a week or ten days and then remove it. This kind is good for shaving and chapped hands.

### TO KEEP SOAP GREASE.

It is often the case that no pains are taken to keep grease that is designed for soap away from flies and other insects, or from rats and mice. It may be kept clean and pure, so that the soap will be perfectly clean, by shutting it up in a box with a tight cover, or an iron pot with a close lid. It has been thus kept free of mould and other impurities through the heat of a long summer and is a great and essential improvement.

## VALUABLE MISCELLANEOUS RECEIPTS COMPRISING A VARIETY OF SUBJECTS.

### FOR INDELIBLE INK.

To four drachms of Lunar caustic in four ounces of water, add sixty drops of nutgalls made strong by being pulverized and steeped in soft water. The mordant which is to be applied to the cloth before writing is composed of one ounce of pearlash dissolved in four ounces of water, with a little Gum Arabic dissolved in it. Wet the spot with this, dry and iron the cloth, then write.

### TO TAKE MILDEW OUT OF LINEN.

Take soap and rub it well, then scrape on some fine chalk, rub that also in the linen, lay it on the grass, as it dries wet it a little, it will come out at twice doing.

### TO GIVE SILVER PLATE A LUSTRE.

Dissolve alum in strong lye, skim it carefully, then mix it with soap, and wash your silver, using a linen rag.

### FOR RED MARKING INK.

Half an ounce of vermilion, one drachm of sal of steel finely levigated with linseed oil to a proper consistency.

### RANCID OIL.

May be restored to its original purity and sweetness, by being heated with a certain quantity of calcined magnesia.

### TO RESTORE THE COLOR OF WOOLEN CLOTH DISCHARGED BY AN ACID.

Take equal parts of pearlash and quicklime dissolved in water and wet the parts with it. The place wet will become a reddish brown, a little vinegar now applied will restore it to its original black.

### TO TAKE GREASE OUT OF SILK.

Apply a little magnesia to the wrong side and the spots will soon disappear.

### ANOTHER THAT NEVER FAILS, GOOD FOR CARPETS, WOOLEN, SILK, OR COTTON.

Pulverize fine, new pipe stems or pipes, lay it on the spot, put a brown paper when you can, under the cloth, and one over the powder, set on it a warm iron, and it will extract all the grease, if it remains sufficiently long.

### ANTIDOTE AGAINST MICE.

Gather wild mint, put it where you wish to keep them out, and they will not trouble you.

### BLOATING IN CATTLE.

A tablespoonful of spirits of ammonia for an ox or a cow, a teaspoonful for a sheep diluted with water.

### TO DESTROY RED ANTS.

Crack shag bark walnuts and lay where you wish to

collect them, and then wet the cracks where they come with corrosive sublimate

### TO MAKE WAFERS

Mix flour and water to a thick paste, and have your flat irons at a moderate heat, lay on just oil enough to keep them from sticking, place one between a couple of common chairs with the face upward, color the paste with venetian, or vermilion, or prussian blue, and lay on a very small quantity on the face of the iron, have the face of the other oiled and set it on the other, and it will press it out and scald it through. Take this off and continue the process until finished. Have something prepared to cut them with, and you have perfect wafers. If they are not cut they answer a good purpose for papers, etc. They will be thick or thin according to the quantity used of the paste. Half a teacupful will make a large supply.

### TO MAKE COURT PLASTER.

Dissolve isingglass, suspend your silk on a wooden frame by tacks, apply the glue with a brush and let it dry, repeat it, and when dry cover it with a strong tincture of Balsam of Peru. This is the real English court-plaster, it is pliable and never breaks. The more common is covered over with the white of egg and dried.

### WOUNDS ON CATTLE.

The most aggravated wounds are easily cured with the yolk of eggs mixed with the spirits of turpentine. Bathe the part several times a day and the cure will be effected in forty-eight hours.

### TO MAKE A SIMPLE WHITE PAINT.

Skim milk two quarts, fresh slack lime eight ounces, oil six ounces, white Burgundy pitch two ounces, Spanish white three pounds. The lime to be slacked in water exposed to the air, mixed in about one fourth of the milk the oil in which the pitch is to be previously dissolved to be added a little at a time. Then the rest of the milk, and afterward the Spanish white. This quantity will cover twenty-seven yards two coats, and the expense not more than ten pence.

D THOUGH SIMPLE LIQUID BLACKING

Ivory black two ounces, sweet oil half a tablespoonful. brown sugar half an ounce. Mix them well and then gradually add half a pint of small beer, and a teaspoonful of gum arabic. As it dissolves, shake it well and it is ready for use.

TO MAKE A VARNISH FOR CRAYONS, PENCIL DRAWINGS, ETC.

A thin wash of isingglass or gum arabic put on with care, will prevent them rubbing out. The same effect it is said may be produced by skimmed milk. It must be perfectly free from cream. Lay the drawing flat upon the surface of the paper, and take it up by one corner until it drains and dries.

INK POWDER FOR IMMEDIATE USE.

Reduce to powder ten ounces of gall nuts, three ounces of green copperas, two ounces each of powdered alum and gum arabic. Put a little of this mixture into white wine and it will be fit for immediate use.

TO PREVENT INK FROM FREEZING.

Instead of water use brandy with the same ingredients that you use for any ink and it will never freeze.

TO PREVENT MOULD IN INKS.

A quarter of a pint of spirits of wine may be added The most simple and most effectual is to infuse a piece of salt as big as a hazel nut in each quart.

TO PREVENT TEAKETTLES COATING WITH LIME.

Put the shell of an oyster in the teakettle and the lime will adhere to it, instead of coating the sides.

TO MAKE YELLOW BUTTER IN WINTER.

Just before the termination of churning, put in the yolk of eggs. It has been kept a secret, but its value requires publicity.

TO PRESERVE MILK.

Put a spoonful of horseradish into a pan of milk, and it will remain sweet for several days, either in the open air or in a cellar, while other milk will sour

### ANTI-MAGNETIC PROPERTIES OF THE ONION

The magnetic power of a compass needle, will be entirely discharged or changed by being touched with the juice of an onion.

### "WHITE WASH OF THE PRESIDENT'S HOUSE IMPROVED."

Take half a bushel of unslacked lime, and slack it with boiling water, cover it during the process. Strain it and add a peck of salt dissolved in warm water, three pounds of ground rice boiled to a thin paste put in boiling hot, half a pound of Spanish whiting, and a pound of clear glue dissolved in warm water. Mix and let it stand several days. Keep it in a kettle, and put on as hot as possible with a brush. It is said to look as well, and last as long, as oil paint on wood, brick, or stone. The expense is so trifling, that great improvements should be the result.

### A SIMPLE WHITEWASH.

Slack as above, and add to each pail-ful two double handsful of salt. Some think it an addition to add a double handful of fine sand, or sifted ashes, to make it thick like cream for the first coat It covers smoke much better This is better to be used hot. Coloring matter may be used if desired.

### HOW TO HAVE A SHARP RAZOR.

Take a strap of thick leather, such as is used for harness, and fasten at each end upon a piece of wood. Then rub upon its surface a piece of tin until it is smooth. It is said to be worth all the patent straps that have ever been invented.

### TO MAKE WATER COLD, FOR SUMMER.

It may be kept nearly as cold as ice water, by surrounding the pitcher or jar with several folds of coarse cotton, to be constantly wet. The evaporation carries off the heat inside, and it will be reduced almost to freezing. In India and other tropical regions this is common.

### PAINTING HOUSES.

Repeated experiments prove that paint applied between November and March, will last twice as long as that applied in warm weather. The reason is that in cold weath

er the component parts of the paint form a hard substance on the surface, as hard almost as glass, but in warm weather the oil penetrates the boards, and the paint soon wears off.

### BATHING.

Deaths are often recorded from premature bathing. It produces cramps, and there cannot be too much caution used in this matter. Never allow it when the water and weather is cold.

### EFFECTS OF VEGETABLES UPON ANIMALS.

Horses that avoid the bland turnip, will grow fat on rhubarb. Pigs will feed on henbane, but are destroyed by common pepper. Goats will feed on water-hemlock—though to other animals they are rank poison.

### MULBERRY LEAF PAPER

Paper has been made of mulberry leaves, that has been used for writing and printing. It is said to be smooth, strong and delicate, and may be either white or colored.

### RHUBARB PLANT.

The stalk of this plant may be used without danger, but the leaf is said to contain oxalic acid, and if cooked as greens occasions vomiting, and sometimes death.

### THE SUN-FLOWER.

One hundred pounds of this seed afford forty pounds of oil. The refuse of the seed after being expressed is good food for animals. The leaves make cigars that are used in medicine; the stalk affords a superior alkali, and the comb of the seed is choice food for swine.

### PREPARING QUILLS, BETTER THAN THOSE OF HAMBURG.

Suspend in a boiler bunches of quills, fill with water just to touch their nibs. Close it steam tight, boil the water four hours, and take them out. The next day cut the nibs and draw out the pith, and rub them with a piece of cloth and expose them to a moderate heat. The following day they will have the hardness of bone, without being brittle, and be as transparent as glass.

### FOR SPRAINS AND BRUISES IN HORSES

Dissolve an ounce of camphor in eight ounces of spirits

of wine. Then add one ounce of spirit of turpentine. One ounce of spirit of sal ammonia; half an ounce of oil of origanum; one large tablespoonful of laudanum. Rub in a quarter of an hour with the hand four times a day.

### TO MAKE INK FOR MARKING LINEN WITH TYPE.

Dissolve one part of asphaltum, in four parts of oil of turpentine, add lampblack or black lead in fine powder, in sufficient quantity to render of proper consistence to print with type.

### TO MAKE PATENT CEMENT.

Lime, clay, and oxide of iron, separately calcined and reduced to a fine powder, are to be intimately mixed. Keep it close, and when used mix with a little water. It will make cracks in wood water-tight, etc.

### TO REMOVE GREASE FROM BOOKS.

Lay upon the spot, a little magnesia or powdered prepared chalk, and under it the same; set on it a warm flat iron, and as soon as the grease is melted, it will be all absorbed, and leave the paper clean.

### TO DESTROY CROWS IN CORNFIELDS.

Steep corn in arsenic and place where they come, and it is said they will never come again.

### TO KEEP HAMS IN SUMMER.

Take them early in Spring, and pack them in barrels with oats, barley, bran, or anything of the like, to protect them from flies etc., and they will keep good. Another SURE way is to rub the hams with pulverized nitre; let them remain in the cellar three days, smoke a barrel three days, and make a pickle of salt and sugar, put in your hams and the work is done for the year.

### SIMPLE MODE OF PURIFYING WATER.

A tablespoonful of powdered alum, sprinkled into a hogshead of water, and stirred, will in the course of a few hours precipitate to the bottom all the impure particles and leave the water as clean and pure as spring water Four gallons would need but a teaspoonful.

### CEMENT FOR STOVE PIPES.

Cracks in stoves and pipes may be closed by a paste made of salt, ashes and water. Iron filings, sal ammonia and water, make a harder and more durable cement.

### OIL OF PUMPKIN SEED.

One gallon of seed will give about half a gallon of lamp oil, and it may be used as olive oil. It is pressed like flaxseed.

### SOAP FOR PLANTS.

This is excellent for asparagus and peas, and for plants in pots it gives them a fine deep healthy green, and makes them strong and luxuriant.

### TO PREVENT DANGER FROM ICE.

You can keep pavements and step stones clear of ice by sprinkling coarse salt on the ice. It will cause it to crack and thaw, can be easily removed or swept away

### THE BEECH TREE.

It is said that this tree is never struck by lightning. It has been noticed in Europe and America. Preserve and rear them for the protection of animals on your plantation.

### GRAPE VINES FOR BEES.

It is said to be the most convenient and best thing for bees to alight on when they swarm, and should be always planted near them for that purpose.

### ICE VAULTS IN CELLARS.

Select a suitable place, and dig a hole five or six feet square, and nearly as deep. Wall it with brick or stone. It may be improved by a double cover filled with tan bark, or tan laid over the ice six inches deep, and then a common cover.

### REMOVING PUTTY.

Moisten the putty with nitric or muriatic acid, and it may be removed at once. Strong soap will answer the same purpose.

### CEMENTING GLASS OR CHINA.

Provide some very finely powdered quick lime in a muslin bag Take the broken ware and rub the edges

with the beaten white of an egg. Take the lime and sift it thick over the edge rubbed with egg, press and bind the pieces together, and let them remain several weeks. For coarser crockery, rub the parts with white paint, made of white lead and linseed oil, press and bind until fully dry. They will last as long as new.

### TOMATOES FOR COWS.

This has been tried, and is said will improve the quantity and richness of the milk, giving to the cream and butter a rich golden color, and will be found a cheap article of food.

### MILKING.

One steady hand that will do it quick and easy, should always milk. It should be done at regular hours, and care should be taken to do it clean.

### LABOR-SAVING SOAP.

Take two pounds of sal soda, two pounds of yellow bar soap and ten quarts of water. Cut the soap in thin slices, and boil together two hours, strain and it will be fit for use. Put the clothes in soak the night before you wash, and to every pail of water in which you boil them, add a pound of soap. They will need no rubbing, merely rinse them out, and they will be perfectly clean and white.

### A FIRE PROOF GLUE OR CEMENT.

Mix and boil together quicklime and linseed oil. It should be as thick as soft putty, and then spread on tin plates to dry hard. This when used should be melted like common glue and used while hot.

### OIL OF FLOWERS.

Split cotton wadding and dip in pure Florence or sweet oil, lay this in a jar or china dish, cover it with a thick layer of rose leaves, or any odoriferous flower or plant, from which you wish perfume. Then lay over another layer of cotton steeped in oil, and so on until filled. Cover it closely and place in the sun a week. Throw away the leaves and squeeze the oil in vials for use. The scented cotton will perfume your clothes.

### A SIMPLE AND EASY METHOD TO EXTRACT GREASE

If the spot is small and light, simply laying magnesia on both sides, and warming it at the fire will do, by repeating. But if larger set on a warm iron. The pipe stems are surer for a large spot.

### THE RED ANT.

Where they are troublesome, it is said that sage leaves fresh picked, will keep them away if scattered in places you wish to protect.

### POULTRY.

No poultry should be kept longer than three years The Poland topknots are considered the best for laying, and are the most hardy. They should be kept in winter where it is warm, have plenty of food and water, a box of gravel and lime to wallow in, and to pick from; some fresh meat when they cannot get insects; the scraps from tallow factories are good, and you will have no lack of fresh eggs.

### THE BENEFIT OF TOADS.

Never destroy them, keep them in your garden to destroy bugs and fleas. They will do more to preserve a garden than a man from insects.

### BLUE INK SPOTS.

Blue ink should be first washed in sweet milk, and then rub strong soft soap on the spot and it will soon disappear.

### STAGGERS IN SWINE.

Before giving anything, pour soft oil on the issues of their legs, and rub them well, then give as much new rum and pepper as you can make them take with a spoon. This it is said has cured those that were nearly dead. No time should be lost in giving something heating within.

### GAPES IN CHICKENS.

A preventive is said to be, vinegar that has stood in iron, to put a little in their food every few days. It is caused by worms in the throat, and it is said there is no effectual remedy better than giving sulphur in their drink, a pepper corn occasionally. They may be reached and taken out of the throat with the end of a feather.

### TO TEMPER NEW OVENS AND IRON WARE.

Before new ovens are used, they should be heated half a day and then put up the lid to keep the heat in. When heated the second time, they may be used for baking. If not treated in this way they will never retain heat well.

New flat-irons should be heated half a day before they are used. Iron ware of all kinds, and stoves should be heated gradually at first or they may crack. Cold water if poured on hot iron will crack it.

### TO RELIEVE CHOKED ANIMALS

Take a flexible rod about four feet long, and three fourths of an inch in diameter, wind on the butt end, tow or cotton, and tie a rag over that and grease it. To keep the mouth open place a piece of hard wood one foot long, four inches wide, one inch thick with a hole bored in the centre for the rod to pass through, and then push it gently down the throat, and it is said to be always effectual and to give immediate relief. It is also said that a round stick about the size and length of a rolling pin with a cord tied in the notches in the ends, placed in the animal's mouth and fastened to each horn, will, if allowed a little time, unchoke them and save the suffering creature from a lingering death.

### COUGH IN HORSES.

It is said that the small twigs of cedar chopped fine and mixed with their grain will cure a cough, and that has been used with complete success.

### AN INSECT TRAP.

Scoop out the inside of a turnip, scollop the edges, nd place it downward on the earth. The insects will pass into it as a place of retreat through the holes, and the cucumbers, squashes, melons, etc., may soon be clear of them.

### RED RASPBERRY LEAVES.

It is asserted that the fine green leaves of the red raspberry gathered in a fair day, and cured in an open room, are not inferior to the China teas.

### TO REMOVE GREASE FROM BOARDS.

Moisten clay or ground water lime with warm water, and after scraping the spot with a knife, lay it on and let it remain all night. If necessary repeat the process. This will soon remove it all.

### TO CLEAN PAINT THAT IS NOT VARNISHED.

Take a flannel and squeeze nearly dry out of warm water, and dip in a little whiting, apply to the paint and with a little rubbing it will instantly remove grease, smoke, or other soil. Wash with warm water and rub dry with a soft cloth. It will not injure the most delicate color, and makes it look as well as new, besides, it preserves the paint much longer than if cleaned with soap and water.

### REMEDY FOR POISON.

It is said that a gill of melted lard poured down the throat of a sheep poisoned by eating laurel is a certain cure.

### BEES.

In winter the best place in which to keep bees is a dry, cold, and dark room, or outhouse. The colder the winter the better if the air is dry. Damp is injurious and will cause mould in the comb and among the bees.

### COCKROACHES

Procure from the druggist a small quantity of poke-root, boil in water til the juice is extracted, mingle the liquor with molasses and spread it on large platters or soup plates in places where they visit, and they will be slain by hundreds in the following morning. The root after being boiled, laid in closets, etc., will prevent their troubling you.

### A DELICATE CEMENT FOR GLASS OR CHINA

One ounce of mastic and as much spirits of wine as will need to dissolve it. Soak an ounce of isingglass in water until quite soft, then dissolve it in rum or brandy until it forms a strong glue, to which add a quarter of an ounce of gum ammonia, well rubbed and mixed. Put the two mixtures together over a gentle heat until united, and keep in a vial well stopped. When used, place the vial

in a kettle of warm water, warm the glass or china, and apply the cement, carefully fitting it together, keeping it close for twelve hours at least, it will then be sound, and the place scarcely perceptible.

### TO KILL WEEDS IN GRAVEL AND BRICK WALKS.

Keep them moist with brine a week in the spring, and three or four days in the fall, and it will prevent their growing.

### TO TEMPER EARTHENWARE.

When new, and before used for baking, put it in cold water to cover, and heat it gradually until the water boils. It is less likely to crack.

### FOR MAKING BLACK INK

Take four ounces galls, two ounces copperas, one ounce of gum arabic Beat the galls and put them in a quart of warm soft water. Soak eight or nine days in the hot sun, or by the fire, shaking it often. Then add the copperas and gum, and it is fit for use in two or three days. The gum arabic must be dissolved in warm water, and a half ounce of alum powdered, added to the whole

### RED INK.

Boil over a slow fire four ounces of Brazil wood chips in a quart of water till a third is evaporated, add while boiling, two drachms of alum in powder, when the ink is cold, strain it through fine cloth. Vinegar may be used instead of water.

### TO MAKE BLACKING.

Put one gallon of vinegar into a stone jug, and one pound of ivory black well pulverized, a half pound of loaf sugar, a half ounce of oil of vitriol, and six ounces of sweet oil, incorporate the whole by stirring. This blacking is in great repute in different countries. It is less injurious than most blackings and produces a fine polish never to be surpassed.

### A SALVE FOR CUTS AND SORES.

One ounce and a half of olive oil, two ounces of white diaculum, and two ounces of beeswax, melted together

### TO RENDER CLOTH WIND AND RAIN PROOF.

Boil two pounds of turpentine, and one pound of litharge in powder, and two or three pints of linseed oil. The article is to be brushed over and dried in the sun.

### WHITEWASH THAT WILL NOT RUB OFF.

Mix up half a pail full of lime and water, take half a pint of flour and make a starch of it, and pour it into the whitewash while hot. Stir it well and it is ready for use.

### TO PREVENT IRON FROM RUSTING.

Warm it and rub it with bees-wax, put it to the fire until it has soaked in the wax, then rub it with a cloth. ANOTHER, take fresh grease and rub, soaking it in by the fire.

### CANDIED LEMON OR PEPPERMINT FOR COLDS.

Boil one pound and a half of sugar in a half pint of water till it begins to candy round the sides, put in eight drops of essence. Pour it upon buttered paper and cut it with a knife.

### TO PREVENT MOULDING IN BOOKS, INK, PASTE AND LEATHER.

Collectors of books will not be sorry to learn that a few drops of oil of lavender will insure their libraries from this pest. A single drop of the same will prevent a pint of ink from mouldiness for any length of time. Paste may be kept from mould entirely by this addition, and leather is also effectively secured from injury by the same agency.

### FIRE AND WATER PROOF CEMENT.

To a half a pint of milk, put an equal quantity of vinegar to curdle it. Take only the whey, and mix four or five eggs, beating the whole together. When mixed, add sifted quicklime until it acquires the consistence of a thick paste. With this, broken vessels, and cracks of all kinds may be mended. It dries quickly, and resists the action of water, and a considerable degree of fire.

### TO EXTRACT ESSENTIAL OIL FROM FLOWERS.

Take any flowers you like, and lay a layer of flowers

and then one of salt in an earthen jar, when filled carry it to the cellar; forty days after, strain the whole by pressure. Bottle that essence and expose it four or five weeks in the sun and dew to purify. One drop will scent a quart.

### VARNISH FOR SHOES IMPERVIOUS TO WATER.

Take a pint of linseed oil, six ounces of beeswax, two ounces of resin, half an ounce of mutton tallow, and melt them together, stirring them well. When about milk warm, apply it. The leather should be dry. Repeat it a few times warming it in, and no water can pass through, and it greatly increases the durability of boots and shoes

### FOR CURING BEEF.

Let your meat be cold, not frozen. For two hundred pounds use two quarts of molasses, half a pound of salt petre, half a bushel of salt. Dissolve your salt-petre in warm water, then add your molasses, pack down your beef light, putting salt in your barrel and between each layer, let a suitable proportion be put between each layer of the above composition, until it is altogether. Use four or five quarts of salt to make a brine to cover the beef. Add two ounces of pearlash to the composition, and some think black pepper or cinnamon a great improvement. It will be very sweet, tender and nice, either way.

### TO CLEAN GOLD.

Wash it in warm suds with ten or fifteen drops of sal volatile.

### BEESWAX.

To separate beeswax from the comb in the best manner. Tie it up in a linen or woollen bag with a pebble or two to keep it from floating; place it in a kettle of cold water and place over the fire, as the wax melts it rises to the surface, while all the impurities remain in the bag.

### FOWLS.

In winter hens should be fed in part with potatoes, turnips, carrots, cabbage, etc., to supply the want of seeds and grass they obtain in summer, also lime and pebbles should be put within their reach. This treatment will

cause them to lay in winter. Bones, eggshells and soaked corn are good.

### FIREPROOF CEMENT.

Take as much lime as is usual in making a pot full of whitewash, and let it be mixed in a pail full of water; in this put two and a half pounds of brown sugar and three pounds of fine salt. If one pound of alum be added it will greatly improve the cement. Mix it well and it is completed. A little lampblack, yellow ochre, or other coloring to change the appearance, may be introduced. It is used as a protection against fire, and is considered valuable. The French use it to preserve the roof and to protect it.

### A NEW RAT TRAP.

Take a smooth kettle, fill to within six inches of the top with water, cover the surface with chaff or bran, place it where the rats harbor, and it will drown all that get into it. Thirty-six were taken in one night by this process.

### TO PROTECT GRAIN, ETC., FROM RATS.

Green elder boughs scattered in and about places where ney are troublesome, it is said will protect effectually against their depredations

### HEN'S EGGS.

Those that approach nearest to roundness produce females, while those that are more pointed produce males.

### MAD DOGS, A PREVENTIVE.

Mix a small portion of the flour of sulphur with their food or drink. This has been known in Europe for centuries, and is used to prevent this disease from breaking out among the packs of hounds upon the estates of English noblemen.

### CURE FOR THE BLACK TONGUE.

A handful of fine salt rubbed upon the tongue of a horse that has this disease, will effect a cure in two or three applications.

### PRESERVATION OF THE DEAD.

The beneficia effects of this, are experienced in the

case of keeping bodies for the recognition of friends. A solution of alum in hot water, in the proportion of two pounds to a pint, is injected through the right carotid arteries and veins throughout the whole body. In summer three quarts of the solution are required, and in winter less. This is to preserve the body in its original state

### GERMAN SILVER.

Few are aware of the poisonous qualities of this compound. It is good for a variety of uses, but should never be used for spoons or vessels for cooking. It is composed of copper, arsenic, and nickel. It is oxydized by acids, and acts in the stomach as a slow but sure poison.

### TO CLEAN KID GLOVES.

White kid gloves may be kept nice, by rubbing them when they are soiled, with india rubber. If it becomes necessary to wash kid gloves, take a piece of flannel, moisten it with a little milk, rub it on a cake of nice hard soap, and apply it to the soiled part of the glove. As soon as the dirt is removed, rub the spot with a dry piece of flannel. It should be done on the hand.

### TO MAKE RED SEALING WAX.

Take of shellac well powdered, two parts, of resin and vermilion, each one part, mix them well together and melt them over a gentle fire, and when the ingredients seem thoroughly incorporated, work the wax into sticks. When shellac cannot be procured seedlac may be substituted. The resin should be of the whitest kind. Less vermilion may answer. If black is preferred, substitute ivory black. If green, use powdered verdigris, or any other color may be used.

### TO REVIVE FADED BLACK CLOTHES.

Boil two or three ounces of logwood in vinegar, and when the color is extracted, drop in a piece of carbonate of iron, which is of the same nature as rust of iron, as large as a chestnut, let it boil. Have the coat or pantaloons well sponged with soap and hot water, laying them on a table and brushing the nap down with a sponge Then take the dye upon the table and sponge them all

over with the dye, taking care to keep them smooth and to brush downward. When completely wet with dye, dissolve a large teaspoonful of saleratus in warm water, and sponge all over with this, and it sets the color so completely, that nothing rubs off. They must not be wrung or wrinkled, but carefully hung up to drain. The brownest cloth may be made a perfect black in this simple manner.

### TO CLEAN A COAT OR PANTALOONS.

Take brown hard soap and rub the collar where it is soiled well, and wherever there is a spot of oil, also the cuffs, and lower part of the sleeve. Have soft water boiling hot, dip out a pint, and lay the cuff and lower part of the sleeve in the scalding water until it acts upon the soap and soil, then take it out, and with a knife, or the nail, take off the loose dirt, then dip again, and rub downward with the sponge, and cleaning inside of the cuff well. Then get another pint of hot water, and do the other in the same way. Then the collar which will need more hot water. When all the most soiled places are scalded and sponged, then soap a little water, do the coat all over, rubbing downward, then rinse in the same way with warm water, and finish off with the sponge wrung as dry as possible. Then hang up so as to preserve the shape, and drain and dry. This process will give to soiled clothes a lustre, and an appearance of new cloth, besides making them perfectly clean. Pantaloons done in the same manner.

### TO BLEACH WOOL, SILK AND STRAW.

Take a barrel, or box, and nail in muslin or gauze around the upper part, in a way to have it hang a little loose. If straw, first soak them well in pearlash water until they are golden yellow, then lay them in loosely over the muslin, and when a little drained, take live coals into a kettle, or chaffing-dish, and sprinkle over some pounded brimstone, and set under the straw in the box, or barrel, have it covered close at the top. Repeat this until they are bleached white; they should be stirred and made to lie as loose as possible whenever the fire is re-

newed. Silk and wool will bleach without being wet. The box, or barrel, should be open at the bottom, that the fire may be easily put under by simply raising it at one side. If bonnets, straw or leghorn are stained or soiled, before bleaching, they should be washed clean with soap and water, and the stains taken out with tartaric acid. This does not injure the braid, and will make old hats look very white.

### TO TAKE OUT FRUIT SPOTS.

Wet the stain without dipping, and hold the part over a lighted common brimstone match at a proper distance The sulphurous gas soon causes the spots to disappear.

### TO TAKE OUT WAX.

Put on spirits of turpentine, or sulphuric ether. The marks of white paint also, may be discharged in the same way. Holding a red hot iron near to melt, will sometimes answer by evaporation.

### AN IMPROVED BLACKING.

Take of ivory black and treacle, each twelve ounces, spermaceti oil, four ounces, white wine vinegar, four pints; mix. This not containing vitriol will not injure the leather.

### STOPPING A LEAK.

Take yellow soap and beat it up thick with whiting, and rub it into the leak, it will be found to stop it when other things have failed.

### A CHEAP AND VALUABLE COMPOSITION FOR THE ROOFS OF HOUSES.

Take one measure of fine sand, two measures of wood ashes sifted, three of slackened lime ground up with oil, laid on with a painter's brush, first coat thin, and the second thick. It adheres strongly, and resists the action of fire.

### REMEDY AGAINST FROST.

Deposit wet strawy compost in the forks of a fruit tree when in blossom to protect the fruit from frost. If applied in the evening, and frost should occur in the night,

it is said that it will be visible on its surface, but the fruit, buds, or blossoms will escape injury.

### TO KEEP LEMON JUICE.

Buy the fruit when cheap, roll them in the hand to make them mellow. Squeeze the juice into a china, or earthen bowl, and strain it, not permitting the pulp to pass. Have ready ounce and half ounce vials perfectly dry. Fill them with the juice so near the top as to admit only half a teaspoonful of sweet oil into each, a little more in larger ones. Cork them and place them where it is cool. When you want it for use, take such a sized bottle as you will use in two or three days. Wind some clean cotton round a skewer, or a bit of wire, and just dip it in, the oil will all be absorbed, and the juice as fine as when first bottled.

### TO MAKE HONEY WATER.

Put two drachms of tincture of ambergris, and as much tincture of musk, into a quart of rectified spirits of wine, and half a pint of water. Put it in small bottles for use.

### TO REMOVE INK FROM LINEN.

Take pure tallow, melt it, and dip the spotted part into the tallow, put it in the wash, and it will become perfectly white.

### CURE FOR A WEN.

Take alum salt, make a strong brine, simmer it on a fire, in which wet a piece of cloth and apply it for thirty successive days, and it will disappear.

### SEWING ON GLAZED CLOTH.

Pass a cake of white soap over any stiffened material, and the needle will penetrate with perfect facility.

### TO DESTROY MOTHS.

The vegetable musk seed should be thinly laid in the folds of fir or woolens. These seeds are highly esteemed by French perfumers for their fragrance. To destroy the vitality of the eggs which produce moths, a weak solution of oxmuriate of mercury in the spirits of rosemary, half a drachm to a pint, or a weak solution of arseniate of

potash in the same spirit, about fifteen grains to a pint, is employed in preparing birds for stuffing, to prevent their being injured by moths.

### A CHEAP WATERPROOF PASTE.

Take any kind of oil, or lard, and mix with it india rubber cut fine, let it simmer over a slow fire until well incorporated, adding oil or lard, until it is of proper consistency.

### TO KEEP AWAY MUSQUITOES.

Attach a piece of flannel or sponge to a thread made fast to the top of the bedstead, wet the flannel or sponge with camphorated spirits, and they will leave the room

### TO DESTROY BEDBUGS.

Rub the bedsteads well with lamp oil, this alone is good, but to make it more effectual, get a sixpence worth of quicksilver and add to it, put it into all the cracks around the bed and they will soon disappear. The bedsteads should first be scalded, and wiped dry, then put on with a feather.

### TO MAKE COLOGNE WATER.

Take a pint of alcohol, and put in thirty drops of oil of lemon, thirty of bergamot, and half a gill of water. If you desire musk, or lavender, add the same quantity of each. The oils should be put in the alcohol and shook well, before the water is added. Bottle it for use.

# ADDITIONS BY AN ENGLISH HOUSEKEEPER.

## PUDDINGS, ETC.

### PLUM PUDDING.

One pound of flour, half a pound of suet chopped fine. half a pound of raisins. half a pound of currants, a quarter of a pound of sugar, two ounces of candied peel, the rind of a lemon grated, a pinch of salt, some nutmeg. Mix well together, and make into a stiff batter, with three eggs and a little milk. Boil three hours.

### CARROT PUDDING.

Half a pound of flour, six ounces of suet chopped, half a pound of currants, three table-spoonsful of sugar, a little spice of candied peel, half a pound of carrots, well boiled and rubbed through a sieve. Mix the other ingredients thoroughly; then add the carrots; boil four hours.

### LEMON PUDDING.

The rind of one lemon, boiled tender and beat fine, with a little raw peel grated, six ounces of sugar sifted, four ounces of butter melted. Mix all together well, then add the yolks of six eggs, well beaten. Line a dish with paste, pour the mixture in, and bake half an hour.

### TAPIOCA PUDDING.

A pint and a half of new milk, a tea-cupful of tapioca, and two ounces of sugar, to be put together, and boil five minutes; then pour it into a basin; when cold, add four whole eggs, well beaten; flavor with the essence of lemon, or what you please; put the mixture into a well-buttered mould, and steam it for an hour. It is excellent, when cold, with preserved fruit.

### CUP PUDDING.

Half a pound of butter, half a pound of flour, half a pound of sugar, half a pound of eggs; mix the eggs and

sugar, then add the flour, and afterward the butter, which must first be beaten to a cream; to be baked in cups, in a quick oven, twenty-five minutes.

### POTATO CHEESE-CAKES.

Half a pound of potatoes, boiled and rubbed through a sieve, half a pound of butter, beat to a cream, half a pound of white sugar, the yolks of six eggs, twenty drops of the essence of lemon. The eggs should be beaten separate, and added the last thing. Line a dish with good paste, and pour the mixture in. Bake half an hour

### LEMON CHEESE-CAKES.

A quarter of a pound of butter, three quarters of a pound of sugar, six eggs, the grated rind of two lemons and juice of three. Put all these into a pan, over a slow fire, gently stirring it, till as thick as a good cream; then pour it into jars, and tie them down close. Keep it in a dry place, and it will be good for a year. Line a dish with paste, as above.

### MINCE MEAT.

Four pounds of raisins, four pounds of currants, four pounds of apples chopped fine, four pounds of beef suet, do., three pounds of beef, do., four ounces of citron, four ounces of orange and lemon candied, two nutmegs, two ounces of cloves and allspice, half an ounce of cinnamon, one pound of white sugar. Mix all well together.

### LEMON CREAM.

Take the rinds of two lemons, cut them, put them into a pint of cold water, let it stand all night, squeeze the juice into the water, sweeten to your taste, beat the whites of six eggs to a strong froth, put all together into a pan, and stir over a very slow fire till warm—not hot enough to curdle—stir gently till cold, and put into glasses. It should be made several hours previous to being served.

### LEMON ICE.

For a quart mould, take a pint and half of water, the rind of three lemons, and three and a quarter pounds of

loaf sugar; boil for ten minutes. When nearly cold, add the yolks of eight eggs and juice of eight lemons, well beaten together; mix like a custard—freeze it in the usual manner—it is excellent. Orange ice may be made in the same way.

### CUSTARD ICE.

Make a nice, smooth custard, with the yolks of ten eggs to a pint and half of thin cream. Flavor with what you please. When half frozen, add some dried fruit, cut in small pieces; mix up, and finish freezing.

## PRESERVING.

### ORANGE MARMALADE.

Take three dozen Seville oranges, grate the rind off eight, peel the remainder, and throw the rinds in cold water; wash them well, and boil them till tender; divide the oranges, and scrape out all the pulp, but be careful not to have any of the seeds among it; cut the rinds in thin strips, and add them to the pulp and that which is grated. Weigh it, and to every pound of fruit add one pound and a quarter of sugar. Boil it quickly for twenty minutes.

### WHOLE STRAWBERRIES.

Take some of the largest and best kind; have ready some boiling syrup, in a large preserving pan; put them in gently, let them boil five minutes. The next day, strain the syrup from them and boil it, and pour it over them. Continue to do so until the thin syrup has done rising; then put them in jars. Tie them down securely.

### SEVILLE ORANGES OR LEMONS IN SYRUP.

Choose those that are clear and free from spots; wipe them, and let them remain in water a day and night; boil them till tender; drain them, and make a thin syrup, sufficient to cover them, in which boil them for a quarter of an hour. Repeat this every day, until the syrup is a proper thickness. Put them into jars, and tie them close down.

### TO PRESERVE CITRONS.

They should not be too ripe. Cut the soft part out, and let them lie in cold water all night. Boil them very tender, drain them on a cloth, and to every three pounds of citron add four pounds of sugar, two quarts of water, and two ounces of ginger; boil them for half an hour. The next day, boil them till very clear, take them out, and add one pound more sugar, moistened with a little water and the juice of five or six lemons; boil it a few minutes, put the citron in jars, pour the syrup over them, and, when cold, tie down very close.

### CHERRY JAM.

Take twelve pounds of good, juicy cherries, stone and mash them as much as possible, put them in a pan and let them simmer gently till the juice is nearly dried up. Add three pounds of finely powdered sugar and the kernels; stir it all well together, and boil till it will drop off the spoon. This should be put in saucers or shallow jars.

### TO PRESERVE GREEN GAGES.

They should be gathered when quite dry, and not too ripe. Put them in a preserving pan, with a layer of vine leaves under and over; cover with water, a small piece of alum, and the same of saltpetre. Simmer them very gently till green and tender; take them out carefully into a pan of cold water, drain them in a cloth, and have ready a thin syrup to put them in. Boil the syrup every day, adding a little sugar, till of a proper thickness; the last day, put the gages in and boil for a few minutes.

### APPLE JELLY.

Take a peck of nice, juicy apples, pare and core them, put them into a pan with two quarts of water; boil them gently, but not too much; strain the juice through a bag or sieve; to every pint add three quarters of a pound of loaf sugar and the rind of a lemon pared very thin. Boil it twenty minutes or half an hour.

### ANOTHER.

Take half a gallon of the greenest apples, pare and core

them, put them in a pan with water to cover them, boil one hour, strain the juice, and to every pint add three quarters of a pound of sugar, the juice of two lemons, and the rind of one. Boil one hour.

### DRIED CHERRIES.

Stone them, and to every pound of fruit take half a pound of sugar; put the cherries in an earthen pan, a layer of fruit and a layer of sugar; let them stand three days, then boil them a few minutes. When cool, take them out of the syrup and drain them, spread them thin on hair sieves, and dry them in the sun. They should be turned every few hours, on clean sieves, till dry.

### RASPBERRY VINEGAR.

Mix a quart of the best vinegar with two quarts of fine red raspberries; let it stand for nine days, or longer if not fermented; then strain them through a fine sieve, and to every pint of liquor add three quarters of a pound of fine sugar; simmer it gently, and finish by boiling quickly for twenty minutes. This makes a pleasant drink with cold water.

## CAKES.

One pound of fresh butter, one pound of sugar, two pounds of flour, two pounds of currants, three quarters of a pound of candied citron, lemon, and orange, a quarter of a pound of sweet almonds blanched and chopped, ten eggs, one ounce of mixed spice. Melt the butter to a cream, add the sugar and spice, and beat for a quarter of an hour. Add the yolks of the eggs, two or three at a time; the whites should be beaten to a strong froth, and worked in gradually; then add the fruit and almonds and flour. Bake three hours.

### QUEEN-CAKE.

Fourteen eggs, one pound of fresh butter, one pound of flour, one pound of sugar; the yolks and whites to be beat separately; half a pound of currants or candied peel.

### RICE-CAKE.

Half a pound of butter, half a pound of sugar, six eggs, a quarter of a pound of flour, a quarter of a pound of rice flour. Melt the butter to a cream, and add your sugar; stir it till it is light, break in six eggs, two at a time, and keep stirring your paste all the time; when the eggs are worked, add the ground rice and flour. Bake this in a hoop, in the same way as a plum-cake.

### THICK GINGERBREAD

Half a pound of flour, a quarter of a pound of butter, two ounces of sugar, one pound of molasses, half an ounce of ground ginger, a quarter of an ounce of saleratus dissolved in a tea-spoonful of warm milk. Rub butter, sugar, and ginger well in the flour; add the molasses and saleratus the last thing.

### GINGERBREAD CAKES.

A pound and a half of flour, half a pound of moist sugar, half a pound of butter, two ounces of ginger—rubbed well together, and mixed with three quarters of a pound of molasses.

### HONEYCOMB GINGERBREAD.

Half a pound of flour, half a pound of moist sugar, a quarter of a pound of butter, half an ounce of ginger, half the peel of one lemon grated, and all the juice. Mix all together to a paste, with half a pound of molasses; make it thin enough to spread upon sheet tins rubbed with butter; bake it in a moderately hot oven, and watch it all the time. When baked, it must be cut upon the tins, with a knife, in strips, and roll it around a wafer-stick. It will keep good for a month, in a very dry place, and closely covered.

### POUND-CAKE.

One pound of flour, one pound of butter, one pound of sugar, one pound of eggs, half a pound of citron. Beat the butter to a cream, then add the sugar and yolks of eggs, a few at a time, then the whites. Beat all well together stir the flour lightly in, and the citron the last thing.

### ALMOND-CAKES.

One pound of fine flour, three quarters of a pound of loaf sugar sifted, two eggs, half a pound of butter, a quarter of a pound of currants, one ounce of bitter almonds blanched and pounded. Mix all well together, and make into small cakes. Bake about ten minutes.

### SHREWSBURY CAKES.

Half a pound of butter, half a pound of flour, three quarters of a pound of sifted sugar, one egg, a quarter of an ounce of carraway seeds. Mix all these ingredients well together, make into a paste, and roll out thin, using as little flour as possible; cut them out with a round cutter. and bake in a hot oven.

### RUSKS.

Half a pound of sugar, seven eggs, six ounces of flour, one ounce of carraway seeds, or not. The eggs should be very fresh. Beat the whites to a strong froth, whisk in the yolks and powdered sugar and seeds. The flour should be stirred gently in with a spoon. Bake in buttered moulds, in a warm oven. When cold, cut them in slices, and brown them in a hot oven, first on one side, then on the other.

### MACAROONS.

One pound of sweet almonds, a pound and a quarter of sugar sifted, six whites of eggs, and the rasping of two lemons. Pound the almonds very fine with the whites of eggs; when quite smooth, add the sugar and lemon raspings; have some wafer-paper on flat baking-sheets, and place the paste in small lumps on it. Bake them in a moderately-heated oven. When cold, cut the paper round them. They should be kept in a dry place.

### SPONGE-CAKE.

Twelve eggs, twelve ounces of flour, one pound of sugar, and the raspings of two lemons. Beat the yolks, lemon, and sugar well together for twenty minutes, beat the whites to a strong froth, and pour the batter into it, then add the flour very lightly.

### A VERY NICE CAKE.

Six eggs, half the whites, two ounces of sugar sifted, a quarter of a pound of flour, a quarter of an ounce of sweet and half an ounce of bitter almonds pounded fine. The sugar, yolks of eggs, and almonds to be well mixed, the whites beaten separately, and the flour added the last thing. To be baked in a quick oven, half an hour.

### TEA-CAKES.

Two pounds of flour, a quarter of a pound of butter rubbed in the flour, one pint of milk, one egg, a tea-spoonful of sugar, and a little yeast—made into a light dough, and set to rise. This is sufficient for twelve large cakes.

### CURRY-POWDER.

Six ounces of pale-colored turmeric, five ounces of black pepper, 13 ounces of coriander seed, three ounces of cummin seed, two ounces of fenugreek seed, one ounce of Cayenne pepper. All these ingredients are to be ground fine separately, and well mixed.

### TO MAKE CURRY.

Take a fowl, or any white meat, cut it up in joints or small pieces, fry them a light brown in a little butter, and put them on a plate; have ready three middling-sized onions cut fine, and fry them also; then add a table-spoonful and a half of the curry-powder, and two of flour. Mix it smooth, and moisten with a pint of weak broth or water; peel and core a good-sized apple, and cut it in small pieces, and add to the sauce; put the meat in and let it stew gently for an hour. Before serving, skim very carefully and strain the sauce. Plain boiled rice should be served with it.

### TO PICKLE MUSHROOMS.

Wipe them carefully, put them in an earthen vessel, and sprinkle salt over them; let them stand for eight hours; put them in a pan and strain the liquor to them; let them boil till nearly dry; take them out and lay between clean cloths, and boil some good vinegar with pepper and mace; put them in, and give them a boil up; put them into glass bottles, and cork tight.

# THE

# HASTY-PUDDING.

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## CANTO I.

YE Alps audacious, thro' the heavens that rise,
To cramp the day and hide me from the skies;
Ye Gallic flags that o'er their heights unfurl'd,
Bear death to kings, and freedom to the world,
I sing not you. A softer theme I choose,
A virgin theme, unconscious of the Muse,
But fruitful, rich, well suited to inspire
The purest frenzy of poetic fire.

Despise it not, ye Bards to terror steel'd,
Who hurl'd your thunders round the epic field;
Nor ye who strain your midnight throats to sing
Joys that the vineyard and the still-house bring;
Or on some distant fair your notes employ,
And speak of raptures that you ne'er enjoy.
I sing the sweets I know, the charms I feel,
My morning incense, and my evening meal,
The sweets of Hasty-Pudding. Come, dear bowl,
Glide o'er my palate, and inspire my soul.
The milk beside thee, smoking from the kine,
Its substance mingl'd, married it with thine,
Shall cool and temper thy superior heat,
And save the pains of blowing while I eat.

Oh! could the smooth, the emblematic song
Flow like the genial juices o'er my tongue,
Could those mild morsels in numbers chime,
And as they roll in substance, roll in rhyme,
No more thy awkward unpoetic name,
Should shun the Muse, or prejudice thy fame

But, rising grateful to th' accustom'd ear,
All bards should catch it, and all realms revere!

Assist me first with pious toil to trace,
Thro' wrecks of time thy lineage and thy race;
Declare what lovely squaw, in days of yore,
(Ere great Columbus sought thy native shore,)
First gave thee to the world; her works of fame
Have liv'd indeed, but liv'd without a name.
Some tawny Ceres, goddess of her days,
First learn'd with stones to crack the well-dry'd maize
Thro' the rough sieve to shake the golden show'r,
In boiling water stir the yellow flour—
The yellow flour, bestrew'd and stir'd with haste,
Swells in the flood and thickens to a paste,
Then puffs and wallops, rises to the brim,
Drinks the dry knobs that on the surface swim;
The knobs at last the busy ladle breaks,
And the whole mass its true consistence takes

Could but her sacred name, unknown so long,
Rise like her labours, to the son of song,
To her, to them, I'd consecrate my lays,
And blow her pudding with the breath of praise
If 'twas Oello, whom I sang before,
I here ascribe her one great virtue more.
Nor thro' the rich Peruvian realms alone
The fame of Sol's sweet daughter should be known
But o'er the world's wide climes should live secure,
Far as his rays extend, as long as they endure.

Dear Hasty-Pudding, what unpromis'd joy
Expands my heart, to meet thee in Savoy!
Doom'd o'er the world thro' devious paths to roam,
Each clime my country, and each house my home,
My soul is sooth'd, my cares have found an end,
I greet my long-lost, unforgotten friend.

For thee thro' Paris, that corrupted town,
How long in vain I wander'd up and down,
Where shameless Bacchus, with his drenching hoa
Cold from his cave, usurps the morning board
London is lost in smoke and steep'd in tea;
No Yankee there can lisp the name of thee;

The uncouth word, a libel on the town,
Would call a proclamation from the crown.*
From climes oblique, that fear the sun's full rays,
Chill'd in their fogs, exclude the gen'rous maize;
A grain whose rich luxuriant growth requires
Short gentle showers, and bright etherial fires.

But here, tho' distant from our native shore,
With mutual glee we meet and laugh once more
The same! I know thee by that yellow face,
That strong complexion of true Indian race,
Which time can never change, nor soil impair,
Nor Alpine snows, nor Turkey's morbid air;
For endless years, thro' every mild domain,
Where grows the maize, there thou art sure to reign

But man, more fickle, the bold license claims,
In different realms to give thee different names.
Thee the soft nations round the warm Levant
*Polenta* call, the French, of course, *Polente;*
Ev'n in thy native regions, how I blush
To hear the Pensylvanians call thee *Mush!*
On Hudson's banks, while men of Belgic spawn
Insult and eat thee by the name *Suppawn.*
All spurious appellations, void of truth;
I've better known thee from my earliest youth,
Thy name is *Hasty-Pudding!* thus our sires
Were wont to greet thee fuming from their fires;
And while they argu'd in thy just defence
With logic clear, they thus explain'd the sense:—
"In *haste* the boiling caldron o'er the blaze,
"Receives and cooks the ready-powder'd maize;
"In *haste* 'tis serv'd and then in equal *haste,*
"With cooling milk, we make the sweet repast.
"No carving to be done, no knife to grate
"The tender ear, and wound the stony plate;
"But the smooth spoon, just fitted to the lip,
"And taught with art the yielding mass to dip,
"By frequent journeys to the bowl well stor'd
"Performs the hasty honours of the board."
Such is thy name, significant and clear,
A name, a sound to every Yankee dear,

* A certain king, at the time when this was written, was publishing proclamations to prevent American principles from being propagated in his country.

But most to me, whose heart and palate chaste
Preserve my pure hereditary taste.

There are who strive to stamp with disrepute
The luscious food, because it feeds the brute;
In tropes of high-strain'd wit, while gaudy prigs
Compare thy nursling man to pamper'd pigs;
With sovereign scorn I treat the vulgar jest,
Nor fear to share thy bounties with the beast.
What tho' the gen'rous cow gives me to quaff
The milk nutritious; am I then a calf?
Or can the genius of the noisy swine,
Tho' nursed on pudding, thence lay claim to mine?
Sure the sweet song, I fashion to thy praise,
Runs more melodious than the notes they raise.

My song resounding in its grateful glee,
No merit claims; I praise myself in thee.
My father lov'd thee thro' his length of days!
For thee his fields were shaded o'er with maize;
From thee what health, what vigour he possess'd,
Ten sturdy freemen sprung from him attest;
Thy constellation rul'd my natal morn,
And all my bones were made of Indian corn.
Delicious grain! whatever form it take,
To roast or boil, to smother or to bake,
In every dish 'tis welcome still to me,
But most, my Hasty-Pudding, most in thee.

Let the green succotash with thee contend,
Let beans and corn their sweetest juices blend,
Let butter drench them in its yellow tide,
And a long slice of bacon grace their side;
Not all the plate, how fam'd soe'er it be,
Can please my palate like a bowl of thee.

Some talk of Hoe-cake, fair Virginia's pride,
Rich Johnny-cake this mouth has often try'd;
Both please me well, their virtues much the same,
Alike their fabric as allied their fame,
Except in dear New England, where the last
Receives a dash of pumpkin in the paste,
To give it sweetness and improve the taste.
But place them all before me, smoking hot,
The big round dumpling rolling from the pot;

The pudding of the bag, whose quiv'ring breast,
With suet lin'd, leads on the Yankee feast;
The Charlotte brown, within whose crusty sides
A belly soft the pulpy apple hides;
The yellow bread, whose face like amber glows,
And all of Indian that the bake-pan knows—
You tempt me not—my fav'rite greets my eyes,
To that lov'd bowl my spoon by instinct flies.

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## CANTO II.

To mix the food by vicious rules of art,
To kill the stomach and to sink the heart,
To make mankind, to social virtue sour,
Cram o'er each dish, and be what they devour,
From this kitchen Muse first ffam'd her book,
Commanding sweets to stream from every cook;
Children no more their antic gambols tried,
And friends to physic wonder'd why they died.
Not so the Yankee—his abundant feast,
With simples furnish'd, and with plainness dress'd,
A num'rous offspring gathers round the board,
And cheers alike the servant and the lord;
Whose well-bought hunger prompts the joyous taste
And health attends them from the short repast.

While the full pail rewards the milk-maid's toil,
The mother sees the morning caldron boil;
To stir the pudding next demands their care,
To spread the table and the bowls prepare;
To feed the children, as their portions coo.,
And comb their heads, and send them off to school.

Yet may the simplest dish, some rules impart,
For nature scorns not all the aids of art.
E'en Hasty-Pudding, purest of all food,
May still be bad, indifferent, or good,
As sage experience the short process guides,
Or want of skill, or want of care presides,
Whoer'er would form it on the surest plan,
To rear the child and long sustain the man;

To shield the morals while it mends the size,
And all the powers of every food supplies—
Attend the lessons that the Muse shall bring,
Suspend your spoons, and listen while I sing.

But since, O man! thy life and health demand
Not food alone, but labour from thy hand,
First in the field, beneath the sun's strong rays,
Ask of thy mother, earth the needful maize;
She loves the race that courts her yielding soil,
And gives her bounties to the sons of toil

When now the ox obedient to thy call,
Repays the loan that fill'd the winter stall,
Pursue his traces o'er the furrow'd plain,
And plant in measur'd hills the golden grain.
But when the tender germ begins to shoot,
And the green spire declares the sprouting root,
Then guard your nursling from each greedy foe,
Th' insidious worm, the all-devouring crow.
A little ashes, sprinkled round the spire,
Soon steep'd in rain, will bid the worm retire;
The feather'd robber with his hungry maw
Swift flies the field before your man of straw,
A frightful image, such as school-boys bring
When met to burn the Pope, or hang the King.

Thrice in the season, thro' each verdant row
Wield the strong plough-share and the faithful hoe—
The faithful hoe, a double task that takes,
To till the summer corn, and roast the winter cakes.

Slow springs the blade, while check'd by chilling rains,
Ere yet the sun the seat of Cancer gains;
But when his fiercest fires emblaze the land,
Then start the juices, then the roots expand;
Then, like a column of Corinthian mould,
The stalk struts upward, and the leaves unfold;
The bushy branches all the ridges fill,
Entwine their arms, and kiss from hill to hill.
Here cease to vex them, all your cares are done;
Leave the last labours to the parent sun;
Beneath his genial smiles the well-dress'd field,
When autumn calls, a plenteous crop shall yield

Now the strong foliage bears the standards high,
And shoots the tall top-gallants to the sky;
The suckling ears their silky fringes bend,
And pregnant grown, their swelling coats distend,
The loaded stalk, while still the burthen grows,
O'erhangs the space that runs between the rows;
High as a hop-field waves the silent grove,
A safe retreat for little thefts of love,
When the pledg'd roasting-ears invite the maid,
To meet her swain beneath the new-form'd shade,
His gen'rous hand unloads the cumbrous hill,
And the green spoils her ready basket fill;
Small compensation for the two-fold bliss,
The promis'd wedding and the present kiss.

Slight depredations these; but now the moon
Calls from his hollow tree the sly 'racoon;
And while by night he bears his prize away,
The bolder squirrel labours thro' the day.
Both thieves alike, but provident of time,
A virtue, rare, that almost hides their crime.
Then let them steal the little stores they can,
And fill their gran'ries from the toils of man;
We've one advantage where they take no part,—
With all their wiles they ne'er have found the art
To boil the Hasty-Pudding; here we shine
Superior far to tenants of the pine;
This envied boon to man shall still belong,
Unshar'd by them in substance or in song.

At last the closing season browns the plain,
And ripe October gathers in the grain;
Deep-loaded carts the spacious corn-house fill,
The sack distended marches to the mill;
The lab'ring mill beneath the burden groans,
And show'rs the future pudding from the stones;
Till the glad house-wife greets the powder'd gold,
And the new crop exterminates the c'd.

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## CANTO III.

The days grow short; but tho' the falling sun
To the glad swain proclaims his day's work done,

Night's pleasing shades his various tasks prolong,
And yield new subjects to my various song
For now, the corn-house fill'd, the harvest home,
Th' invited neighbours to the *Husking* come;
A frolic scene, where work, and mirth, and play,
Unite their charms, to chase the hours away.

Where the huge heap lies centr'd in the hall,
The lamp suspended from the cheerful wall,
Brown corn-fed nymphs, and strong hard-handed beaux
Alternate rang'd, extend in circling rows,
Assume their seats, the solid mass attack;
The dry husks rustle, and the corn-cobs crack;
The song, the laugh, alternate notes resound,
And the sweet cider trips in silence round.

The laws of husking ev'ry wight can tell;
And sure no laws he ever keeps so well;
For each red ear a gen'ral kiss he gains,
With each smut ear she smuts the luckless swains;
But when to some sweet maid a prize is cast,
Red as her lips, and taper as her waist,
She walks around, and culls one favour'd beau,
Who leaps, the luscious tribute to bestow.
Various the sport, as are the wits and brains
Of well-pleas'd lasses and contending swains;
Till the vast mound of corn is swept away,
And he that gets the last ear, wins the day.

Meanwhile the house-wife urges all her care,
The well-earned feast to hasten and prepare.
The sifted meal already waits her hand,
The milk is strain'd, the bowls in order stand,
The fire flames high; and, as a pool (that takes
The head-long stream that o'er the mill-dam breaks)
Foams, roars and rages with incessant toils,
So the vex'd caldron rages, roars, and boils.

First, with clean salt she seasons well the food,
Then stews the flour and thickens all the flood.
Long o'er the sim'ring fire she lets it stand;
To stir it well demands a stronger hand;
The husband takes his turn; and round and round
The ladle flies; at last the toil is crown'd;
When to the board the thronging huskers pour,
And take their seats as at the corn before.

I leave them to their feast. There still belong
More copious matters to my faithful song.
For rules there are, tho' ne'er unfolded yet,
Nice rules and wise, how pudding should be ate.

Some with molasses line the luscious treat,
And mix, like bards, the useful with the sweet.
A wholesome dish, and well deserving praise,
A great resource in those bleak wintry days,
When the chill'd earth lies buried deep in snow,
And raging Boreas drives the shiv'ring cow.

Blest cow! thy praise shall still my notes employ,
Great source of health, the only source of joy;
How oft thy teats these pious hands have press'd!
How oft thy bounties prove my only feast!
How oft I've fed thee with my fav'rite grain!
And roar'd, like thee, to find thy children slain!

Ye swains who know her various worth to prize,
Ah! house her well from winter's angry skies.
Potatoes, pumpkins, should her sadness cheer,
Corn from your crib, and mashes from your beer;
When spring returns she'll well acquit the loan,
And nurse at once your infants and her own.

Milk, then, with pudding, I should always choose;
To this in future I confine my Muse,
Till she in haste some future hints unfold,
Well for the young, nor useless to the old.
First in your bowl the milk abundant take,
Then drop with care along the silver lake
Your flakes of pudding; these at first will hide
Their little bulk beneath the swelling tide;
But when their growing mass no more can sink;
When the soft island looms above the brink,
Then check your hand; you've got the portion's due,
So taught our sires and what they taught is true.

There is a choice in spoons. Tho' small appear
The nice distinction, yet to me 'tis clear,
The deep bowl'd Gallic spoon, contriv'd to scoop
In ample draughts the thin diluted soup,
Performs not well in those substantial things,
Whose mass adhesive to the metal clings;

Where the strong labial muscles must embrace,
The gentle curve, and sweep the hollow space.
With ease to enter and discharge the freight,
A bowl less concave but still more dilate,
Becomes the pudding best. The shape, the size,
A secret rests unknown to vulgar eyes;
Experienc'd feeders can alone impart
A rule so much above the lore of art.
These tuneful lips, that thousand spoons have tried,
With just precision could the point decide,
Tho' not in song; the muse but poorly shines
In cones and cubes, and geometric lines.
Yet the true form, as near as she can tell,
Is that small section of a goose egg-shell,
Which in two equal portions shall divide
The distance from the centre to the side.

Fear not to slaver; 'tis no deadly sin,
Like the free Frenchman, from your joyous chin
Suspend the ready napkin; or, like me,
Poise with one hand your bowl upon your knee;
Just in the zenith your wise head project,
Your full spoon, rising in a line direct,
Bold as a bucket, heeds no drops that fall,
The wide-mouth'd bowl will surely catch them all.

# MAIZE OR INDIAN CORN.

# INDIAN CORN.

## *Synonymes.*

| *Zea mays,* | Of Botanists. |
|---|---|
| Maize, Indian Corn, | Britain and Anglo-America. |
| Maïs, Blé d'Indie, Blé de Turquie, | France. |
| Maiz, Trigo de Indias, | Spain. |
| Grano d'India, Grano Turco, Grano Siciliano, | Italy. |
| Maiz, Milho da India, Milho grande, | Portugal and Brazil. |
| Mais, Türkischer Korn, | Germany. |
| Mays, Turksch Koorn, | Holland. |
| Turkish Hvede, | Sweeden and Denmark. |
| Tureskoichljeb, | Russia. |

*Derivations.*—The generic name *Zea* is derived from the Greek *zao*, to live, from the nutritive qualities of this, or some other kind of corn formerly cultivated in Greece or on the adjacent Archipelago. The word *mays*, and all its derivatives, according to Clavigero, have been derived from the denomination of this vegetable in the Haitina language, or that of Hispaniola; but by others, it is thought to come from the Lettish and Livonic *mayse*, which signifies bread in those languages. The European names *Blé d'Indie, Trigo de Indias*, etc., have been so called on account of this grain having first been brought by Columbus from America, which was known at that time by the name of the "Indies;" and those names signifying "Turkish Corn," took their origin from the circumstance that the cultivation of this plant spread from Turkey to the neighbouring countries, and consequently led some writers to believe that it first came from the East.

## *Description.*

The fruitful maize, in verdant vistas rear'd,
Its spire majestic, to the playful breeze,
Spreading its loosely-waving panicles, while low
The purple anthers bending o'er to kiss
The silken, tassel'd styles, delight the eye
Of watchful Ceres. Traits of the Aborigines.

Maize, or Indian Corn, consists of several varieties which are thought to owe their distinctive characters to the accidental modifications of climate, soil, and

culture, rather than to any original differences. The plant is described by botanists, as a strong, reedy, jointed stalk, provided with large alternate leaves, almost like flags, springing from every joint. The top produces a bunch of male flowers, of various colours, which is called the *tassel*. Each plant bears, likewise, one or more spikes or *ears*, seldom so few as one, and rarely more than four or five, the most usual number being three; as many as seven have been seen occasionally on one stalk. These ears proceed from the stalk at various distances from the ground, and are closely enveloped by several thin leaves, forming a sheath, which is called the *husk*. The ears consist of a cylindrical substance, of the nature of a pith, which is called the *cob*, over the entire surface of which the seeds are ranged, and fixed in eight or more straight rows, each row having generally as many as thirty or more seeds. The eyes, or germs of the seeds, are in nearly radial lines from the centre of the cylinder; from these eyes proceed individual filaments of a silky appearance, and of a bright-green colour; the aggregate of these hang out from the point of the husk, in a thick cluster, and in this state are called the *silk*. It is the office of these filaments, which are the stigmata, to receive the farina, which drops from the flowers on the top or tassel, and without which the ears would produce no seed,—a fact which has been established by cutting off the top previous to the development of its flowers, when the ears proved wholly barren. So soon as their office has been thus performed, both the tassel and the silk dry up, and put on a withered appearance.

The grains of maize are of different colours, the prevailing hue being yellow of various shades, sometimes approaching to white, and at other times deepening to red. Some are of a deep chocolate-colour, others greenish or olive-coloured, and even the same ears will sometimes contain grains of different colours.

*Geography and History.*—Indian Corn, when due regard is paid to the selection of varieties, may be accounted as a sure crop, in almost every portion of the

habitable globe, between the forty-third degree of north latitude, and a corresponding parallel south. Its principle culture is confined to the United States, Mexico, the West Indies, and most of the states of South America. It is also cultivated with success in Spain, Portugal, Lombardy, and may be grown in southern Europe generally. It is likewise found to thrive in India, China, Japan, Australia, the Sandwich Islands, as well as in the groups of the Azores, the Madeiras, Canaries, and numerous other ocean isles

Roulin, Humboldt, Bonpland, and others, have noticed this plant in its indigenous state in America, and hence have concluded that it was first derived from this country. Mathioli, Cieça, Zeri, and Inca Garcilasso, have also confirmed this opinion. Fuchs, on the contrary, very early maintained that it came from the East. Michaud, Daru, and Bonafous, state that it was known in Asia Minor before the discovery of America; and Crawford, in his "History of the Indian Archipelago," tells us that maize was cultivated by the inhabitants of these islands, under the name of *djagoung*, long before that period. In the "Natural History of China," composed by Li-Chi Tchin, towards the middle of the XVIth century, a rude figure is given of the Zea mays, under the title of *la-chou-cha*; and Rifaud, in his "Voyage en Egypte, &c., from 1805 to 1807," observes, that he discovered this grain in a subterranean excavation in a remarkably good state of preservation. M. Virey, however, in the "Journal de Pharmacie," refutes these statements, by showing that these authors have mistaken the Indian millet (*Sorghum vulgare*) for maize, and that the grain found by Rifaud, was the Sorghum bicolor, which, according to Delile, is a native of Egypt. Regmir and Gregory attempt to present fresh arguments in favour of the Eastern origin of this plant. Among them is the name by which it has long been known in Europe, *Blé de Turquie;* and varieties of it, they state, have been brought from the Isle of France, or from China. Moreau de Jonnés, on the contrary, has more recently maintained in a memoir

read before the Academy of Sciences, at Paris, that its origin was in America. The name *Blé de Turquie*, no more proves it to be of Turkish origin, than the name of the *English Horse Bean* proves that that plant originally grew wild in Britain. The general cultivation of maize, in southern Europe, and the production of some new varieties, proves nothing with regard to the origin of the species. Nor, where it occurs in the East, there is no proof of its having been carried there previously to the discovery of America.

In favour of the American origin of maize, is the fact that it was found in a state of cultivation in most of the places where the first navigators landed. Columbus discovered it on the Island of Cuba, and other points, where he touched on his first voyage to America, Vasco Nuñez, in Guiana, Navaez and Sottus, in Florida, and Gonçalo Ximines, in New Granada,—the latter of whom, says, "The principal food of the natives "was *Maiz* and *Cassave*, which first grows on stalks "of the size of canes, bearing very large and weighty "spikes or ears, each generally yielding seven hundred "grains—a bushel of which, when planted in warm, "moist land, frequently produces three hundred fold. "The maize is distinguished into a coarser and a finer "sort, which last is called *Moroche*, the leaves and "stalks affording wholesome provender for horses, and "the grains or kernels, bread for the inhabitants, who "make it several ways; for sometimes they boil the "corn in water, and at other times, parch it in ashes, "or grind it into flour, which, when kneaded into "dough, they make into cakes, biscuits, etc. More-"over, maize steeped in water, boiled, and afterwards "fermented, makes a very strong liquor."

All the early historians, both of North and South America, give the strongest testimony that this grain is of American origin, and speak of it as having constituted a great part of the food of the Indians from time immemorial.

Inca Garcilasso de la Vega, in treating of the products of Peru, says, "Of the fruits that grow above

"ground, the chief and principal, is that grain which "the people of Mexico and Barlovento call *Mayz*, and "those of Peru, *Cara*, being the only bread they use. "And this is of two sorts, one called *Muruchu*, which "is hard, and the other *Capia*, which is tender and "fine, and is eaten as bread, either boiled, baked, or "parched, over the fire. The hard kind is that which "has been brought to Spain, but not the fine and tender "sort." The corn of the Incas, he says, was ground by women, between two broad stones in the form of a half moon, from the flour of which, they made a kind of hasty-pudding, called *Api*, a great dish among them, esteemed as high feeding, but was not common at every meal. He mentions another kind of bread, made of maize, called *Cara*, upon which he was nourished for nine or ten years. This consisted of three sorts, namely, *Cancu*, used only for sacrifice; *Huminta*, for feasts and great entertainments; and *Tanta* or bread of common use. Boiled cara they called *Muti*, which is also the name of boiled corn. The virgins or wives of the Sun, were employed in the evening in kneading great quantities of dough, which they formed into small round cakes that were eaten by the Indians only at the feasts of *Raymi* and *Citua;* for, at other times, they never eat their maize kneaded into bread, nor did they eat it at their meals, with the exception of two or three mouthfuls at the beginning. Their physicians prescribed no other diet to their sick than what was made of maize. They also made plasters or poultices of it, which they applied for the relief of aches, colics, and other pains. Of the flour of maize, mixed with water, the Indians brewed their common beverage, which, by a certain process, they were able to convert into an excellent vinegar. Of the stalks, before the maize was ripe, they made a kind of honey, and some, who loved to be drunk, lay their corn steeping in water, until germination took place, and then, after grinding, boiled it in the same water, drawed it off, and kept it until stale. This was the strongest drink the Peruvians had, which was called, in their language,

*Vinnapu*, and by some of the neighbouring tribes, *Sora*. From its intoxicating effects, its use was prohibited by the Incas, who made it a penal offence with all who drank to excess.

Francisco Saverio Clavigero, in describing the grain of Mexico, says, "The chief, the most useful, and most "common, was the maize, called by the Indians *Tluolli*, "of which there are several varieties, differing in size, "colour, weight, and taste. There is the large and the "small sort, the white, the yellow, the blue, and the "black."

Captain John Smith, in his account of the Indians of Virginia, says, "The greatest labour they take, is "in planting their corne, for the country naturally is "overgrowne with wood. To prepare the ground, they "bruise the barke of the trees neare the root, then doe "they scortch the roots with fire that they grow no "more. The next yeare with a crooked peece of wood "they beat vp the weeds by the rootes, and in that "mould they plant their corne. Their manner is this. "They make a hole in the earth with a sticke, and into "it they put foure graines of wheate (maize), and two "of beanes. These holes they make foure foote one "from another. Their women and children do con- "tinually keepe it with weeding, and when it is growne "middle high, they hill it about like a hop-yard. In "Aprill they begin to plant, but their chiefe planta- "tion is in May, and so they continue till the midst "of Iune. What they plant in Aprill, they reape in "August: for May in September; for Iune in Octo- "ber. Every stalke of their corne commonly beareth "two eares, some three, seldome any foure, many but "one, and some none. Every eare ordinarily hath "betwixt 200 and 500 graines. The stalke being "greene hath a sweet iuice in it, somewhat like sugar- "cane, which is the cause that when they gather their "corne greene, they sucke the stalkes; for as we gather "greene pease, so doe they their corne, being greene, "which excelleth their old. * * * * * Their corne "they rost in the eare greene, and bruising it in morter

"of wood with a polt, lap it in rowles in the leaues of "their corne, and so boyle it for a daintie. They also "reserue that corne late planted that will not ripe, by "roasting it in hot ashes, the heat thereof drying it. "In winter they esteeme it being boyled with beanes "for a rare dish, they call *Pausarowmena*. Their old "wheat (maize) they first steepe a night in hot water, "in the morning pounding it in a morter. They vse a "small basket for their temmes (sieve), then pound "againe the great, and so separating by dashing their "hand in the basket, receiue the flower in a platter made "of wood, scraped to that forme with burning and "shels. Tempering this flower with water, they make "it either in cakes, covering them with ashes till they "be baked, and then washing them in faire water, they "drie presently with their owne heat: or else boyle "them in water, eating the broth with the bread which "they call *Ponap*. The groutes and peeces of the "cornes remaining, by fanning in a platter or in the "wind, away, the branne they boyle 3 or 4 houres with "water, which is an ordinary food they call *Vstata-*"*hamen*. But some more thriftie then cleanly, doe "burne the core (cob) of the eare to powder, which "they call *Pungnough*, mingling that in their meale, "but it never tasted well in bread, nor broth."

Mr. Schoolcraft, in his late Report, says, that it is conceded on all hands, that this is a tropical, or at least, a southern plant. He remarks, that it was not known in Europe before the discovery of this country, and that we learned the mode of cultivation from the Indians, and not they from us. It was cultivated by the Iroquois in fields sufficiently large to entitle them to the name of agriculturists. It was undoubtedly highly prized by them, as an essential article of support, as Mr. Schoolcraft states that the warriors of the Six Nations were in the habit of undertaking journeys of thousands of miles in extent, carrying no other food than a little meal from parched and pounded corn, relying on the forest for meat. One tablespoonful of this meal, mixed with a little sugar

and water, will sustain a warrior for twenty-four hours without meat.

In further proof of the American origin of maize, it may be stated, that it is still found in an indigenous state from the Rocky Mountains, in North America to the humid forests of Paraguay; where, instead of having each grain naked, as is always the case after long cultivation, they are completely covered with glumes or husks. Although there has been much written upon the Eastern origin of this grain, it did not grow in that part of India watered by the Indus, at the time of Alexander the Great's expedition, as it is not mentioned by Nearchus, the commander of the fleet, among the productions of that country. It is not noticed by Arrian, Diodorus, or Columella; and even so late as the year 1471, Joan. Cuba, in his "Ortus Sanitatis," a very curious treatise on plants, trees, animals, stones, &c., does not make the least mention of it. Neither has it ever been found in any ancient tumulus, sarcophagus, or pyramid; nor has it ever been represented in any ancient painting, sculpture, or work of art, except in America! But in this country, according to Garcilasso, the palace gardens of the Incas in Peru were ornamented with images of gold and silver, of all manner of beasts, birds, trees, flowers, and fruit. Some of the trees appeared in blossom, some with their fruit partially or fully grown, and in others it appeared quite ripe, according to the several seasons of the year. They also imitated the maize, with all its grains, spikes, stalks, and leaves; and in one instance, in the "Garden of Gold and Silver," there was an entire cornfield, of considerable size, represented with the corn in its exact and natural shape.

The introduction of maize into Europe, probably dates back to the time soon after Columbus discovered America; but little attention appears to have been paid there, either to its culture or use, until toward the close of the last century. An amusing, and in many respects, an instructive work, was published some years since, by William Cobbett, upon the merits of Indian

corn, whose sanguine wishes upon the subject of its introduction as a field crop into England, led him farther than most people have been inclined to accompany him. A cotemporary writer remarks that, "Cobbett was corn-mad at one time. He saw too soon by twenty years, and depended on cultivation, rather than importation. He wrote about Indian corn, planted Indian corn, raised Indian corn, ate Indian corn, made paper of Indian corn husks, and printed a book from the Indian corn paper." There is to be seen in this work a very minute and interesting account of the various manipulations which must be attended to by the maize-grower before his grain is ready for sale, as well as very particular directions for turning the produce to the best and most profitable account in domestic economy.

The most important feature, perhaps, in the history of maize, is its late introduction from the United States into Great Britain and Ireland, as a cheap and nutritious article of human food. For this partriotic and philanthropic act, these two nations are highly indebted to the simultaneous exertions of our friend and countrymen, Henry Coleman, Esquire, who has been engaged for several years in making an agricultural tour in Europe, and Dr. John S. Bartlett, late of the British army, the latter of whom, addressed a letter on the subject, in May, 1842, to Lord Ashburton, in which he arrives at the following deductions:—

1st. That the labouring classes and the poor of Great Britain require *a cheaper article of food than wheaten bread.*

2nd. That although wheat contains a larger portion of *gluten* or the nutritive ingredient, *bulk* is necessary, not only to satisfy the craving of hunger, but to promote digestion by the "stimulus of distension," which bulk alone can give.

3rd. That the craving of hunger being removed or alleviated by the quantity taken, the mind is more at ease; the mental irritability consequent upon hunger is assuaged, and man goes to his labour with cheer

fulness and vivacity, becoming a more peaceful citizen and perhaps a better man.

4th. That maize possesses a great superiority over rye, barley, oatmeal, or potatoes—not that it contains a greater quantity of *gluten*, but that its constituent parts are better proportioned, and consequently make a better article of food.

5th That, admitted into England duty free, it would be a cheaper article of food than any of those above named, besides being vastly superior to them in nutritive and healthful properties.

6th. That it can be obtained in any quantities from all parts of the United States, and particularly from the middle and southern states, on the Atlantic sea-board —as New York, New Jersey, Pennsylvania, Maryland, Virginia, and North Carolina, whose proximity to the sea and ports of shipment, give them great advantages by saving inland conveyance. The whole valley of the Mississippi also yields it in abundance.

7th. That the people of all parts of the United States are consumers of British manufactures; for in spite of national asperities, they adopt the habits, tastes, fashions, and dress of their English ancestors. This, I think, is a natural feeling in the human breast, for I never yet knew a son who was offended by being told that he resembled his parent. The imported grain then would be paid for in the products of British industry.

8th. That the rapidly increasing population and limited superficial surface of the British Isles, will speedily render a foreign supply of grain necessary even in the most productive seasons—and consequently a reduction of duties must ensue; it is therefore advantageous to the agricultural interests, as land is becoming so valuable, to reserve as much of the soil of England as possible for the cultivation of wheat and more valuable products; and nothing will tend to promote this object more than the introduction of a copious supply of cheaper farinaceous food for the poor and labouring classes.

In closing the historical part of this memoir, it may not be uninteresting to allude to another countrymen of ours, Elihu Burritt, commonly called "The Learned Blacksmith," who is at present engaged in making a pedestrian tour in various parts of Europe, and giving the result of his observations in the "Christian Citizen," from which we make the following extract:—

I have just got out "An Olive Leaf, from the Housewives of America, to the Housewives of Great Britain and Ireland, or Recipes for making Various Articles of Food, of Indian Corn Meal," containing all the recipes I received before leaving home from our kind female friends in different parts of the Union—heaven bless them! I have had 2,000 of these Olive Leaves struck off, and intended, in the first place, to send a copy to every newspaper in the realm. I shall have a thousand, all of which I shall put into the hands of those I meet on the road. I have resolved to make it a condition upon which only I consent to be any man's guest, that his wife shall serve up a johnny-cake for breakfast, or an Indian pudding for dinner. I was invited yesterday to a tea party which comes off to-night, where about thirty persons are to be present. I accepted the invitation with the johnny-cake clause, which was readily agreed to by all parties. So to-night the virtues of corn meal will be tested by some of the best livers in Birmingham.

*Mythology.*—The Indians of Peru and the adjacent country, who existed before the empire of the Incas began, were at best but tamed animals, and often they were more brutish than the beasts of the field. They possessed no right of property, no fixed laws, no religion, nor government; neither did they plough, sow, or till the earth, nor did they understand the art of weaving cotton or wool; but dwelt together in small hordes as they happened to meet in caves or holes in the rocks and mountains, subsisting on grass, herbs and roots, wild fruits, and the flesh of man, with no other clothing than the leaves and bark of trees, and the skins of beasts In short, they were altogether savage.

As ever has been the case with most of the primitive tribes of the human race, these Indians derived their original being from divers objects, animate or inanimate, of which they entertained respect, admiration, or awe. Some who lived near a great lake which supplied them with a store of fish, called that the parent whence they emerged ; some esteemed the mighty Andes as their prime mother, who, from her deep caverns, first gave them birth ; and others fancied themselves to be the descendants of the great bird, condor, in token of which, on days of solemnity and festival, they wore its wings fastened to their arms.

Every nation, province, tribe, and house among them, had its particular idol. For their opinion was, that one god would have enough to do, to take care of its own province, or family, and that its power was so limited, that it could have no virtue or extent within the jurisdiction of another. Some adored whatever they saw in which an excellence could be observed, whether good or bad. The tiger, the jaguar, and the bear, they worshipped for their ferocity, and with such submission and humility, that they would not fly from them in time of danger, but offered themselves to be devoured. The fox and the monkey, they adored for their craft ; the stag for his swiftness ; the hawk, for agility and courage ; the eagle, for acuteness of sight ; while other nations were more considerate in the choice of their deities, and worshipped nothing except what afforded them benefit or advantage. As fountains and cool springs, which furnished them with drink ; rivers, that watered their pastures ; the earth, which they called their mother, because it yielded them food ; the air, because it gave them breath and life ; and fire, because it warmed them, and cooked their food. Some, also, made choice of sheep, cattle, or corn, and everything around them, that served most for nourishment, as a god, and worthy of divine honour. The inhabitants near the coast, made the sea their god, the name of which, interpreted in their language, signifies the "Mother Sea." The whale they deified on account of its pro-

digious size. In the Province of Puerto Viejo, they had a high veneration for the emerald; and near the Cordillera, they worshipped that mountain for its stupendous height.

The sacrifices which they made to these deities were often as barbarous as the gods were senseless; for, besides beasts, fruits, and corn, they sacrificed and devoured alive, men and women of all ages, whom they had taken in war. But other Indians less cruel, and more mild in their character, though they mingled blood with these rites, never took away life, but drew it from the veins of an arm, a leg, or the nostrils, according to the nature or solemnity of the sacrifice required. Others offered sheep and lambs, conies, partridges, and various kinds of fowl, herbs, fruits, and maize, so much esteemed among them, according to the deity they adored.

These people, living and dying in the manner above described, were at length reclaimed by Inca Manco Capac, who, probably, was some Indian of a more elevated understanding and prudence than ordinary, and who, by carrying a refined manner of deportment toward them, had persuaded them that he and his wife, Mama Ocllo Hauco, proceeded from the sun, and were come from heaven; and that his Father, Pachacamac (the Soul of the universe, or the Sustainer of all things), had sent them to instruct and bestow benefits upon the rest of mankind. Manco Capac was the founder of the *Incas*, who were the native kings of Peru, and who, according to tradition, reigned in a direct lineage, until they were conquered by the Spaniards, for the space of four hundred years. The origin of these kings, the majesty and greatness of their empire, their conquests and policies in government, both in peace and in war, together with the laws they instituted for the good and benefit of their subjects, have been recorded by one of their own descendants on the maternal side, Garcilasso de la Vega, surnamed the Inca. Concerning the origin of these kings, he says, that, when he was about seventeen years of age, being one day present with his

kindred in the imperial city of Cuzco, who were discoursing of their ancestors, it came into his mind to ask the most elderly person amongst them, by interrupting him in his discourse, the following questions :—" Inca and " my uncle," said I, " How is it possible, since you " have no writings, that you have been able to preserve " the memory of things past, and the origin of our " kings? I observe that the Spaniards and their " kindred nations have their sacred and profane histories, whereby they learn the time that their own " kings, and the princes of other countries began their " reigns; when and how empires were changed and " transferred; nay, so far they go, as to tell us how " many thousand years are past since God created the " heavens and the earth; all of which, and much " more, they have learned from their books; but as to " yourselves—In what manner can you retain the " memory of your ancestors, or be informed of the " origin of the Incas? As, for instance, who was the " first of them, or what was his name? Of what " lineage, or in what manner did he begin his reign? " What nations did he conquer, and when did he give " a being to this great empire, and with what exploits " did our ancestors achieve their greatness?

" The Inca was much pleased to hear me make these " inquiries, because he took great delight in recounting " these matters, and turning to me, said, 'Cousin, I ' most willingly comply with your request; for it con- ' cerns you to hear them, and keep them in your heart ' Remember, then, that in ages past, all this region or ' country, you see around us, was nothing but moun- ' tains and wild forests, and the people in those times ' were like so many brutes, without any religion or ' government, with no understanding of property, or a ' single enjoyment of them; neither did they sow, ' plough, nor clothe themselves, because they had no ' idea of tilling the earth, and knew not the art of ' weaving either cotton or wool. They dwelt two by ' two, or three and three together, as they chanced to ' meet, in caves, or holes in the rocks and mountains

'Their food was herbs or grass, roots of trees, wild 'fruits, and human flesh; and all the covering they 'had, consisted of the leaves or bark of trees, and the 'skins of beasts.

'And now, I pray that you listen with due atten- 'tion, for I would not be troubled to repeat what I 'am to say. Our Father, the Sun, beholding these 'Indians as they existed in the state that I have just 'related, took compassion on them, and sent a son and 'a daughter of his own from heaven to earth, to in- 'struct our people in his knowledge, so that they 'might worship and adore him, and esteem him as their 'God, giving them laws and precepts, unto which 'they might conform their lives like men of reason 'and refinement of manners, that they might live 'in houses and society, learn to till the earth, culti- 'vate trees, plants, and corn, feed their flocks, and 'enjoy them as rational men, and not as brutes. 'With these orders and instructions, our Father, the 'Sun, placed his two children by the Lake Titicaca, 'giving them liberty to go which way they pleased, 'and that, in what place soever they stopped to eat, or 'sleep, they should strike a little wedge of gold into 'the ground, which was about half a yard long, and two fingers thick, and where, with one stroke this 'wedge should sink into the earth, there should be the 'place of their abode, and the court unto which all 'people should come. Lastly, he ordered that when 'they should have subjected these people to the rules 'of obedience, they should maintain them with reason, 'justice, piety, clemency, and gentleness, performing 'all the good offices of indulgent parents towards the 'children they love; and that in imitation of him, 'and by his example who doeth good to all the world, 'by affording them light to perform their work, 'and the actions of life; warming them when they 'are cold; making their pastures and their seeds to 'grow, their trees to fructify, and their flocks to in- 'crease; and watering their lands with timely dews. 'And in order to manifest his earthly care, he said

'every day I take a turn around the world to see and 'discover the wants and necessities of all things, in 'order that, as their true fomenter and parent, I may 'apply myself to their succour and redress. Thus, 'after my example, and as my children, sent upon 'the earth, I would have you imitate me, and to instil 'such doctrine into this people as may convert them 'from beasts unto men. And henceforth I constitute 'and ordain you king and queen over this nation, 'that by your instructions, reason, and government, 'they may be preserved. After our Father, the Sun, 'had thus declared his pleasure to these, his two 'children, he dispatched them from him; and, in 'taking their journey northward from Titicaca, at 'every place where they came to repose, they tried to 'strike their wedge into the ground, but to no effect; 'but, at length they arrived at a little inn or place of 'rest, in the valley of Cuzco, where they again struck 'their wedge of gold into the earth, which received it 'with the greatest ease, and which sucked it in, and 'they saw it no more. Then, said the Inca to his 'sister and wife—in this valley, our Father, the Sun, 'hath commanded that we should stay, and make our 'abode, and in so doing we shall obey his will; in 'pursuance whereof, it is necessary that we now 'separate from each other, and take different ways 'that we may assemble and draw the people together 'in such manner as we may be able to preach and 'propagate the doctrine among them, which has been 'committed to us. Our Inca, accordingly, took his 'way northward, and his wife to the southward, and 'to all the men and women, whom they met in the 'wild forests and uncultivated places, they declared to 'them that their Father, the Sun, had sent them to be 'teachers and benefactors, and to deliver them from 'the savage life they led to another, more agree-'able to reason, justice, and humanity. And in fur-'ther pursuance of the commands of our Father, the 'Sun, they had come to gather these people from the 'mountains and rude places, to more convenient

habitations, where they might live in human society, 'and subsist upon such food as was appropriated to man, 'and not to beasts. These, and similar declarations 'were announced to such savages as they met in the 'mountains and deserts, who, in beholding the grace 'of their countenances, the jewels, and the gay attire 'with which these two persons were adorned, and in 'listening to the gentleness and sweetness of their 'words, acknowledged them to be the true Children of 'the Sun, and such as were appointed to cause their 'people to assemble into societies, and to administer 'such kinds of food as were wholesome, and adapted 'to human sustenance. They were struck with such 'admiration at the sight of their figure and person, 'and allured with the promises they made them, that 'they gave entire credence to their words, obeyed 'them as their princes, and adored them as superior 'beings. And these poor wretches, relating these 'sayings one to another, the fame so increased, that 'great numbers, both men and women, flocked to-'gether, and were willing to follow to what place soever they should guide them.

'Thus, great multitudes of people being assembled together, the princes commanded that provision should be made of such fruits as the earth produced 'for their sustenance, lest they should be scattered 'abroad again in small numbers, to gain their food. 'Our Inca taught some of his subjects those labours, 'which appertain unto men, as to build houses, plough, 'sow the land with maize and divers sort of seeds, 'that were useful or fit for food; to which end he in-'structed them how to make ploughs and other im-'plements necessary for the purpose; he showed them 'also how to make aqueducts and reservoirs for hold-'ing water, and various other arts tending to the more 'commodious well-being of human life. He employed 'others to gather and tame the llamas and more gentle 'sorts of cattle into flocks, which ran dispersed and 'wild through the mountains and woods, that garments 'might be made of their wool, and shoes of their

'skins. On the other hand, Coya Mama Oello in-
'structed the women the art of spinning and weaving
'both cotton and wool, to make garments for their
'husbands, their children, and themselves, with various
'other offices appertaining to a house. In short,
'nothing was omitted that would conduce to human
'welfare, which she did not teach her women, and the
'Inca his men.

'Being reduced in this manner, these Indians looked
'on themselves as much bettered in their condition;
'and with signal acknowledgments of the benefits
'received, travelled with joy and satisfaction through
'the rocks and woods, to communicate the happy
'tidings of the Children of the Sun, who, for the com-
'mon good of all, appeared on the earth, repeating
'the benefits they had received, and showing them
'their new habiliments, and diet, and relating to
'them that they lived in houses and in political
'society. This relation induced these wild people to
'mingle with their civilized brethren, in order to learn
'and obey; and thus, one calling and inviting
'the other, the fame spread far and near, and their
'number increased to such a degree, that in six or
'seven years, the Inca had composed an army sufficient
'for war; and having taught them how to make bows
'and arrows, lances, and such other weapons as we
'use to this day, they were not only capable of defend-
'ing, but also to repulse an enemy, and to compel
'those by force, who led a bestial life, to live in
'human society.

'These were our first Incas and kings in the earlier
'ages of our empire, from whom the succeeding princes,
'and we ourselves, are descended; but how many
'years it may be since our Father, the Sun, sent his
'offspring amongst us, I am not able precisely to say,
'but I imagine that it may be about four hundred
'years.

'And thus having satisfied the request you made to
'me, at length, dear cousin, allow me to close by tell-
'ing you, that in the course of my narrative, in order

'that I might not incline you to sadness, I abstained
'from venting tears from my eyes, which, notwith-
'standing, drop in blood on my heart, caused by that
'inward grief I feel, to see our Incas, and their empire
'ruined and destroyed." '

To this legend, many others of ancient date might be added, one of which, is, that the rays of the sun, after the universal deluge, first fell on the island in Lake Titicaca, before they appeared in any other place, and gave a sign and promise that from that spot the first doctrines of the light of knowledge should eminate, which promise was afterwards accomplished by those kings, who preceded them, and taught the world to throw off their turpitude, and live according to the dictates of nature and of reason. By advantage of these, and other similar inventions, it was not difficult for the Incas to persuade the rest of the Indians, that they actually descended from the sun, and to confirm their belief by the manifold benefits and advantages which their doctrine and religion brought with them. On the assurance of these two fables, it is said, the Incas and all their subjects did really esteem this island to be a sacred and holy piece of ground, upon which, with that opinion, they erected a rich temple, all plated with gold, to be dedicated to their Father, the Sun; where all the Indians of the provinces, subject to the Incas, generally assembled once a year to offer gold, silver, and precious, stones, in thankful acknowledgments of the great blessings they had received. And so immense was the quantity of gold and silver, which was amassed in that island, besides what was cast and wrought into utensils, for the service of the temple, that the report of it made by the Incas, is incredible, and is more to be admired than believed. Blas Valera, a Spanish historian, in speaking of the riches of this temple, says, that after all the vessels and ornaments were supplied, he was told by the Indians of Copa-Cabano, that there was such a superfluity of gold and silver, after all was finished, that another such temple might have been erected without the aid of any other materials! And

that, so soon as the Indians had news of the invasion of the Spaniards, and were informed that their object was to despoil them of their treasures, they demolished their temple, and threw all the fragments and the immense wealth appertaining thereto, into the great lake.

Those Incas, besides the riches they bestowed, and the encouragement they gave for the adornment of this temple, did much to improve the sterile land of this isle, so as to render it more fertile, and fit to produce fruit; and, in gratitude to the place, on which they believed their ancestors to have descended from heaven, they ennobled it by bringing it into the highest state of fertility and the best of husbandry. To this end they levelled and cleared it of rocks and stones, made gardens and covered them over with good earth and manure brought from afar, and thereby made the ground capable of producing maize, which, by reason of its elevation and its consequent coldness of climate, would not grow in the country adjacent. This grain, with flax and other seeds, they sowed in the gardens they had made, which yielded good increase, the fruits of which they sent as sacred presents to the temple of the sun, and to the select virgins, at Cuzco, with orders to distribute them in all other sacred places throughout the dominions. One year they sent presents to Cuzco, the next to another place, and the third year somewhere else, which were held in high esteem, as sacred relics, sowing some in the gardens belonging to the temples, and other public houses, and others they divided among the people. A portion of the grain they cast into the public granaries, and those of the sun and of the king, believing that some divine virtue was contained in it, and that it would bless and increase the corn with which it was mixed, preserve it from corruption, and render it more wholesome for human sustenance; and that Indian who was so happy as to be able to get but one grain of this maize, to throw into his heap, was possessed with the belief that he should never be in want for bread in the course of his life.

During the high feast, *Capacrayni*, held in the first month, *Raymi*, agreeing with our December, no stranger was suffered to lodge in Cuzco, to which they again all assembled as soon as the festival was over, to receive cakes made of maize and the warm blood of a white alpaca, by the *Mamacunas*, (select virgins,) and distributed by certain priests, who, in carrying them about in dishes of gold, gave each of the Indians one, saying as they delivered it, "If you do not reverence the sun and Inca, this food will bear witness against you to your ruin; but if you worship them, then their bodies, by this pledge, will be united to yours." After which, those that had eaten of the cakes, promised obedience, and thanked the sun and Inca for their food.

In the beginning of the month *Hatuncuzqui*, which corresponds to our May, the Peruvians gathered their maize and kept the feast *Aymorai*. They returned home, singing from the fields, carrying with them a large heap of maize, which they called *Perua*, wrapping it up in rich garments. They continued their ceremonies for three nights, imploring the perua to preserve their harvest of maize from any damage that might chance to befall it, and also to cause that to grow prosperously which they should next plant. Lastly, their sorcerers consulted their gods whether the perua could last till the next year; and if they did not answer in the affirmative, they carried it into the fields and burned, or parched it with the view of making a new perua, which they bore to their granaries in great triumph, and mingled it with other corn.

The corn-plant, or its fruit, also entered into the forms, the ceremonies, and the mythology of many other tribes, which, from the limited length of this memoir, and the want of accurate information on the subject, are necessarily omitted. The following allegory, however, which was related to Mr. Schoolcraft by the Odjibwas, will be read with interest by all who have a fondness for this branch of literature:— A young man went out into the woods to fast, at that period of life when youth is exchanged for manhood.

He built a lodge of boughs in a secluded place, and painted his face of a sombre hue. By day he amused himself in walking about, looking at the various shrubs and wild plants, and at night he lay down in his bower, which, being open, he could look up into the sky. He sought a gift from the Master of Life, and he hoped it would be something to benefit his race. On the third day he became too weak to leave the lodge, and as he lay gazing upwards he saw a spirit come down in the shape of a beautiful young man, dressed in green, and having green plumes on his head, who told him to arise and wrestle with him, as this was the only way in which he could obtain his wishes. He did so, and found his strength renewed by the effort. This visit and the trial of wrestling were repeated for four days, the youth feeling at each trial, that, although his bodily strength declined, a moral and supernatural energy was imparted, which promised him the final victory. On the third day his celestial visitor spoke to him. "To-morrow," said he, "will be the seventh day of your fast, and the last time I shall wrestle with you. You will triumph over me, and gain your wishes. As soon as you have thrown me down, strip off my clothes, and bury me in the spot, in soft fresh earth. When you have done this, leave me, but come occasionally to visit the place, to keep the weeds from growing. Once or twice cover me with fresh earth." He then departed, but returned the next day, and, as he had predicted, was thrown down. The young man punctually obeyed his instructions, in every particular, and soon had the pleasure of seeing the green plumes of his sky visitor, shooting up through the ground. He carefully weeded the earth, and kept it fresh and soft, and in due time was gratified by beholding the matured plant, bending with its yellow fruit, and gracefully waving its green leaves and yellow tassels in the wind. He then invited his parents to the spot, to behold the new plant. "It is mondamin," replied his father "it is the spirit's grain." They immediately prepared a feast, and invited their friends to partake of it, and this is the origin of Indian corn.

*Properties and Uses.*—There is no species of the Cerealia, which manifests itself under such varied forms, sizes, colours, and chemical ingredients, as maize. While some persons have estimated it in value, equal, if not superior, to all other kinds of grain, others, on the contrary, have placed it in the lowest station in the group to which it belongs. It has been contended by some that it contains no gluten, and little, if any, ready-formed saccharine matter, and hence, could possess but a very small nutritive power, while others have observed that domestic animals, which are fed on maize, very speedily become fat, with their flesh, at the same time, remarkably firm; that horses, which consume it, are enabled to perform their full portion of labour, are exceedingly hardy, and require but little care; and that the inhabitants of the countries where it forms a large share of their food, are, for the most part, strong, healthy, and long-lived. The investigations of vegetable chemistry, however, have more recently revealed to us many important and interesting facts on these points, yet our knowledge on the subject is far from being complete.

According to Marabelli's analysis of Zea mays, made twenty or thirty years ago, it contains a saccharine matter of different degrees of purity, from which alcohol, the oxalic and acetous acids may be obtained; a vegetable amylaceous substance; a glutinous substance; muriate and nitrate of magnesia; carbonates of potash, lime, and of magnesia; and iron.

According to the analysis of M. Payen, maize consists of the following ingredients. One hundred parts by weight yielded

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|---|---|
| Starch, | 28.4 |
| Nitrogenized matter, | 4.8 |
| Fatty matter, (oil,) | 35.6 |
| Colouring matter, | 0.2 |
| Cellular tissue, | 20.0 |
| Dextrine, | 2.0 |
| Various salts, | 7.2 |
| Loss, | 1.8 |
| | 100.0 |

The proportion of oil is evidently overrated in this analysis, and the error is attributed by Dr. Jackson to the solubility of the *zeine* or gluten of the corn in ether, which Payen used to dissolve the oil. The gluten being taken up by this process, was mistaken for oil, and credited in the analysis as such, when it should have been put under the head of nitrogenized matter. It is not surprising, he remarks that M. Dumas, in quoting this analysis, should observe that "individuals who eat corn for some time, present symptoms of an accumulation of fat in their tissue, which will not appear astonishing, when we consider that a bushel of corn would yield a quart (litre) of oil!" If this doctrine were true, those Americans, who derive a great part of their subsistence from Indian corn, would be an excessively fat people.

According to the analysis recently made in England by Professor Playfair, some specimens of corn of American growth, yielded, in one hundred parts by weight, the following proportions:—

| | |
|---|---|
| Proteine, | 7 |
| Fatty matter, | 5 |
| Starch, | 76 |
| Water, | 12 |
| | 100 |

By this analysis it would seem that maize contains less proteine or nutritive matter, than wheat, oats, or barley, but more than either rice or potatoes. In fact, it contains about three and a half times the quantity of nutritive matter that is found in potatoes, and a much larger proportion of starch, and less water. It also contains more fatty matter than any of these products, which is a very important consideration where the more fattening of animals is taken into account. Hence, as an article of food, either for man or animals, it is superior to potatoes and rice, but inferior to wheat, oats, or barley. It is relished by all animals that are not exclusively carnivorous, and certainly is highly nutritious.

According to the researches of Dr. Charles T. Jackson, of Boston, who stands prëminent as a chemist, Indian corn, in general, is composed of variable proportions of starch, dextrine, gum or mucilage, sugar, gluten, oil, the phosphates of lime and magnesia, with a little phosphoric acid, silica, potash, and oxide of iron. Some varieties, however, are nearly or quite destitute of gluten, oil, or the salts of iron.

Among the curious results of Dr. Jackson's experiments, he proved that the relative proportions of phosphates in grain, depend on the assimilating power of each species, or variety; for an ear of corn having been selected, which had on it two different kinds, namely, the Tuscarora and the sweet corn, more than double the amount of phosphates were obtained from the latter than from the former, notwithstanding the kernels came from the same ear, grew side by side from the same sap, and were derived from the same soil. Hence it may be inferred that a crop of sweet corn will sooner exhaust a soil of its phosphates than any other variety, and if a soil be deficient in these materials, more must be added to produce it in perfection. Some interesting facts were also noticed by him in the variable proportions of phosphates in different varieties of the same species of several kinds of grain, and a greater preponderance of them was observed in Indan corn, than in the smaller grains, as barley, oats, wheat, &c.—a fact which seems to explain their peculiar properties as food for animals; for the more highly phosphatic grains appear to be more likely to surcharge the system of adult animals with bony matter, often producing concretions of phosphate of lime, like those resulting from gout. It is conjectured that the stiffness of the joints and lameness of the feet, common in horses, which have been fed too freely with maize, is caused by the preponderance of the phosphates. Granting this to be true, young animals cannot fail to derive more osseous matter from corn than from any other kind of grain.

The horny or flinty portions of corn, when viewed in

thin sections under a good microscope, will be found to consist of a great number of six-sided cells, filled with a fixed oil, which has been successfully employed for the purposes of illumination. It is stated that a distillery has been established in the vicinity of Lake Ontario, where this oil is extracted, at the rate of sixteen gallons from one hundred bushels of corn, leaving the remaining portion of the corn more valuable and in better condition for distillation than before the oil is extracted. On this oil depends the

POPPING QUALITIES OF CORN.

For, when the kernels are heated to a temperature sufficiently high to decompose the oil, a sudden explosion takes place, and every cell is ruptured by the expansion of gaseous matters arising from the decomposition of the oil, and the formation of carburetted hydrogen gas, such as is sometimes used in lighting large cities, the grain being completely evoluted and folded back, or turned inside out. This property is remarkably strong in the pop corn, and is common, in a greater or less degree, in all kinds of corn that abound in oil; but those varieties destitute of a horny covering, as the Tuscarora, and white flour-corn, will not pop under any circumstances whatever.

This change in corn is one of considerable importance, so far as regards facility of digestion; for, after the decomposition or extraction of this oil, it is more readily digested by man, though less fattening to poultry, cattle, swine, &c.

One important use of the oil in corn is undoubtedly to prevent the rapid decomposition of the kernels, when sown in the soil, and to retain a portion of pabulum or food, until needed by the young plant, and is always the last portion of the grain taken up. It also serves to keep meal from souring, as it has been observed that a flint-corn meal will keep sweet for years, even when put up in large quantities, without being kiln-dried; while the meal of Tuscarora corn will become sour in a very short time.

The colours of Indian corn usually depend on that of the epidermis or hull, and sometimes on that of the oil. If the epidermis be transparent, the colour may depend either upon the oil, or the combined particles of which the corn is composed; but if the hull be opaque, the grain will present the same colour. For example, the yellow colour of the golden Sioux is derived from the yellow colour of the oil; and the Rhode Island white flint-corn on the colourless particles of its starch and oil, which are distinctly seen through its transparent hull; but red and blue corn owe their lively hues to the colours of their epidermis, and not to the oil.

The proportions of oil in corn, as far as it has been examined, varies from an entire absence to eleven per cent., according to the varieties employed.

When corn is hulled by means of potash ley, a portion of the oil is converted into soap, and the epidermis becomes detached. The caustic alkali also liberates ammonia from the mucilage around the germ.

Oily corn makes a dry kind of bread, and is not sufficiently adhesive to rise well without an admixture of rye, or other flour.

The oil of corn is easily convertible into animal fat by a slight change of composition, and consequently serves an excellent purpose for fattening poultry, cattle, and swine. Starch, also, is changed into fat as well as the carbonaceous substances of animals, and during its slow combustion in the circulation, gives out a portion of the heat of animal bodies; while, in its altered state, it goes to form a part of the living frame. Dextrine and sugar act in a similar manner, as a compound of carbon, hydrogen, and oxygen.

From the phosphates of grain, the substance of bone and the saline matters of the brain, nerves, and other solid and fluid parts of the body, are, in a great measure, derived.

The salts of iron go to the blood, and these constitute an essential portion of it, whereby it is enabled, by successive alterations of its degree of oxidation

during the circulation through the lungs, arteries, extreme vessels and veins, to convey oxygen to every part of the body.

By soaking Indian corn, after it has been cut open, in a watery solution of sulphate of copper, (blue vitriol,) the result will give a decisive proof of the presence of phosphoric acid. The "chits," or parts containing the germs, will be changed to a bluish-green, beautifully defining the limits of the phosphates of lime and of magnesia contained in the grain.

By soaking a kernel of corn split open longitudinally and thrown into a solution of sulphydrate of ammonia, the chit is soon changed to a dark olive-colour, which arises from the change of the salts of iron into a sulphuret of that metal.

By cutting open, in a similar manner, a kernel of maize, or any other kind of grain, and dropping upon it a small quantity of the tincture of iodine, a portion of its bulk will be immediately changed to an intense blue, indicating the presence of starch, with here and there a deep port-wine-coloured speck, which will define the parts composed of dextrine. If the oil is extracted from the transparent part of the corn by alcohol, or ether, the tincture of iodine will indicate the presence of starch in that part of the grain associated with the gluten.

By these means, we may readily cause any grain to define the extent and precise limits of each of its ingredients; and by the eye, we can form a pretty correct estimate of their relative proportions in different seeds.*

The varieties of Indian corn are very numerous, exhibiting every grade of size, colour, and conformation between the shrubby reed that grows on the shores of Lake Superior, to the gigantic stalks of the Ohio valley, the tiny ears with flat, close-clinging grains of Canada, the brilliant, rounded, little pearl, or the bright-red grains and white cob of the eight-rowed

* See Jackson's Report on the Geology and Mineralogy of New Hampshire, pp. 255 et seq.

hæmatite, to the swelling ears of the big white, and yellow gourd-seed of the South. The principal varieties cultivated in the United States, which may be distinguished by the number of rows of grains on the cob, and the colour, shape, or size of the kernels, may be classified and described as follows :—

Yellow Corn.—The colours of the varieties coming under this head, as before observed, are dependent mainly on the shades of the oil, as seen through the transparent epidermis or hull.

1. *Golden Sioux* or *Northern Yellow Flint-Corn*, derived from the Sioux Indians, in Canada, having a large cob, rather short as to length, with twelve rows of moderately-sized grains, abounding in oil, and is regarded as one of the best varieties for fattening animals, or for human food. By skilful tillage, 130 bushels have been raised to an acre, weighing 9,216 lbs. in the ear. When dry, 75 lbs. of ears gave a bushel when shelled. Several valuable hybrid varieties have been produced between the Sioux and the King Philip, the gourd-seed and the Sioux, &c.

2. *King Philip* or *Eight-rowed Yellow Corn ;* so called after the celebrated chief of the Wampanoags, of that name, from which tribe the seed was originally obtained. The ears, which contain only eight rows, are longer, the cob smaller, and the grains larger than those of the golden Sioux, and it will yield about the same quantity of oil. It is a hardy plant, much esteemed in New England as a substantial article of food, where it has been cultivated from times anterior to the landing of the Pilgrims From this variety, a number of superb kinds have been obtained, among which, are a beautiful ten and twelve-rowed hybrid from the golden Sioux, and the well known *Browne Corn*, improved by my brother, Mr. John Browne, of Long Island, in Lake Winnipissiogee. The latter variety was produced by cultivating selected ears for a succession of years, of the King Philip corn, with small but-ends, the second ripe, in the field, and taken from stalks which bore more than two ears each The grains

of this corn are large, the cob small, and the ears usually from ten to thirteen inches in length, with only eight rows. It ripens a little later than the golden Sioux, and is very prolific, the greatest crop, per acre, that has yet been raised, being 136 bushels, weighing, in the ear, 9,520 lbs., or 70 lbs. to the bushel, and 58 lbs., when shelled.

3. *Canada Corn* or *Eight-rowed Yellow*.—This corn, which is smaller, earlier, and more solid than any of the preceding, contains more oil than any other variety, except the rice corn, and the pop corn, properly so called. It is highly valued for fattening poultry, swine, &c., and is grown by many, in gardens, for early boiling or roasting, when green. Notwithstanding it is very prolific in ears, it is seldom planted in fields, except in regions where the larger kinds will not thrive.

4. *Dutton Corn*, a variety first brought into notice, in 1818, by Mr. Salmon Dutton, of Cavendish, Vermont. The ears of corn from which it was originally selected, on an average, were from eight to twelve inches long, and contained from twelve to eighteen rows. The cob is larger, and sometimes grows to the length of fourteen or fifteen inches, but the grain is so compact upon it, that two bushels of sound ears have yielded five pecks of shelled corn, weighing 62 lbs. to the bushel. With proper management, an acre of ground will produce from 100 to 120 bushels. As it abounds in oil, gives a good yield, and ripens at least two weeks earlier than the Canada corn, it has long been a favourite for culture at the North.

5. *Southern Big Yellow Corn*.—The cob of this variety is thick and long, the grains much wider than deep, and where the rows unite with each other, their sides fall off almost to a point. This gives the ouside ends of the grain a circular form, which imparts to the ear an appearance somewhat resembling a fluted column. The grain contains less oil and more starch than the northern flinty kinds, yet its outward texture is somewhat solid, flinty, and firm. It comes rather late into maturity, affords an abundant yield, and is much used

for fattening swine. Mixed with either of the white gourd-seed varieties the *Yellow Gourd-Seed* is produced, which is often mistaken for an original form.

6. *Southern Small Yellow Corn.*—The ears of this sort are more slender, as well as shorter, than the last named variety; the grains are smaller, though of the same form, of a deeper yellow, more firm and flinty, and contain an abundance of oil, which renders them more valuable for the purposes of shipping, or for feeding to poultry and swine. Although it is less productive than the big yellow, it ripens earlier, and consequently is sooner out of the reach of the autumnal frosts. Some valuable hybrids have been produced between this and the big yellow, the Virginian white gourd-seed, and other large varieties.

White Corn.—The varieties which constitute this division are exceedingly variable, both as regards their composition and size, as well as in their yield and times of coming to maturity.

1. *Rhode Island White Flint-Corn.*—The grains of this variety are about the size and shape of those of the Tuscarora corn, but differ from them in containing an abundance of a transparent and colourless oil, which may easily be seen through their clear, pellucid hulls. The farinaceous parts of the grains are white, and as the quantity of oil they contain is large, the flour is more substantial as an article of food, and less liable to ferment and become sour. In Rhode Island, where it produces an abundant yield, it is a favourite grain, and stands in high repute.

2. *Southern Big White Flint-Corn*, having a large thick cob, with twelve rows of kernels, much resembling, in shape and size, those of the big yellow, and like that variety, is less productive than the white Virginian gourd-seed. It contains more starch, and less oil than the northern flint-corn; but is much softer and a better food for horses, though not so fattening to poultry and swine. When ground into meal, it is apt to become sour and consequently is unfit to be

shipped in that state, unless previously prepared by being kiln-dried. From this variety originated the genuine *White Flint-Corn*, employed for making the excellent hommony, so much in use in the Middle and Southern States.

3. *Southern Little White Flint-Corn.*—The kernels of this variety are considerably smaller than those of the preceding, and much resemble them in shape; but they are more firm and solid, contain more oil, and consequently are more valuable for feeding poultry and swine, and for human food. Although the cob is smaller in proportion to the size of the ears, the yield, per acre, is less abundant, and hence it is but little grown.

4. *Dutton White Flint-Corn*, a variety not differing materially from the yellow Dutton corn, except in the colour of its oil.

5. *Early Canadian White Flint-Corn*, cultivated principally for early boiling or roasting, while green.

6. *Tuscarora Corn*, a variety obtained from the Tuscarora Indians, in the state of New York. The ears contain from twelve to sixteen rows of grains, which are nearly as deep as they are broad, of a whitish colour on the exterior, and composed entirely within, of pure white dextrine and starch, except the germs. As it contains neither gluten nor oil, it may profitably be employed in the manufacture of starch. It is much softer, and better food for horses than the flinty kinds, and if used before it becomes sour, it may be converted into an excellent bread.

7. *White Flour-Corn.*—The ears of this variety contain twelve rows of rather thick, roundish grains, which are filled with a snowy white flour, composed principally of starch, but does not contain either gluten or oil. It is much used in some parts of the country, particularly in New Jersey, for grinding up with buck-wheat, mixed in proportions of four or five to one of corn, in order to improve the colour and other qualities of the buck-wheat flour. As it possesses similar properties as the preceding variety, it may be profitably employed for the same purposes.

8. *Virginia White Gourd-Seed Corn.*—The ears of this corn, which are not very long, neither is the cob so large as those of the big white or yellow flint, contain from twenty-four to thirty-six rows of very long, narrow grains of so soft and open a texture, that they will not bear transportation, by sea, unless they are previously kiln-dried, or completely excluded from the moist air. These grains at their exterior ends are almost flat, and grow so closely together from the cob to the surface, that they produce a greater yield than any other variety, in proportion to the size of the ears. They contain more starch and less gluten and oil than those of the flint kinds; and from their softness, they serve as better food for horses, but are less nourishing to poultry and swine. The colour of this variety is always white, unless it has been crossed with other kinds, which may invariably be known by a small indenture in the ends of the grains, when perfectly dried. The oily and glutinous parts of the Virginian gourd-seed always occur on the sides of its elongated grains, while the starch projects quite through to their summits, and by contraction in drying, produces the pits or depressions peculiar to their ends. This variety is later ripe, though more productive than any other kind. Several valuable hybrids have been produced by its cross fecundation with the yellow and white flinty sorts, among which, are the *Yellow Gourd-Seed*, and the celebrated *Burden* and *Baden* varieties, the latter of which, has produced as many as ten ears to a stalk!

9. *Early Sweet* or *Sugar Corn*, sometimes called *Pappoon Corn.*—This variety was introduced into Massachusetts, in 1779, by Captain Richard Bagnal, of Plymouth, from the country bordering on the Susquehannah, on his return from the expedition against the tribes of the Six Nations, under the command of General Sullivan. There are two kinds of this corn, one with the cob red, and the other white. The ears are short, and usually contain eight rows, the grains of which, when mature, are of a light colour, and become shrivelled and appear as if they were unripe. It con-

tains an unusually large proportion of the phosphates and a considerable quantity of sugar and gum, though but little starch. It is extensively cultivated for culinary purposes, and serves as a delicious food, either green or dry.

Hæmatite or Blood-red Corn, and Varieties of Different Shades.—The lively hues, peculiar to the red, blue, and purple corns, generally depend on the shades of the epidermis of the grains, and not the oil. The origin of these colours appears to be purely accidental, as white and yellow varieties have been planted at remote distances from any other kind, and have produced kernels of a brilliant red. The different shades of colour in corn are supposed to be caused by different proportions of iron, or other metals, combined with oxygen and some acid principle, acted upon by the rays of light.

1. *Rice Corn*, a variety with small ears, the grains of which are of various shades of colour, and often are of the size and shape of rice. It contains more oil and less starch than any other kind; and when ground, its meal cannot be made into bread alone, but is dry like sand. From its oily nature and convenient size, this corn is peculiarly adapted for feeding fowls.*

2. *Pop* or *Parching Corn*, sometimes called *Valparaiso Corn* (*Zea curagua*, of botanists.) The ears of this variety are small, the grains of various shades of colour, and contain, next to the rice corn, more oil and less starch, than any other kind. Its flavour is pleasant, when parched, for which purpose it is generally preferred. This variety is believed to be the *Cara* of the Incas of Peru, which, when parched, they call *Cancha*, signifying a neighbourhood or street.

* See Dr. Jackson's Report, pp. 258 et 259.

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